Matrix Switchers

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Bandwidth & Matrix Switcher Performance

Understanding the Details

The importance of allowing for adequate bandwidth in video systems has been apparent to video system designers for quite some time. Extron encourages use of the *"Bandwidth Rule of Thumb"* as a guideline for choosing video products with sufficient bandwidth performance. The *"Bandwidth Rule of Thumb"* states: *"Always use a product with two to three times the bandwidth of the original video signal."* Unfortunately, as with most rules of thumb, it does not address the technical details and loopholes that assault the designers of today's high performance video systems. It is the purpose of this article to provide design professionals with the tools they need to understand the details of video performance as they pertain to bandwidth. Ensuring proper bandwidth performance should not be a guessing game or a task of interpretation. This article should take the mystery out of understanding what bandwidth specifications mean to video that you can see.

Following the *"Bandwidth Rule of Thumb"* should assure there is only a minimal amount of signal degradation. Designers should never specify products that have the same bandwidth as the original signal. Why? Because manufacturers of video products specify bandwidth at half the power or -3dB point. That -3dB point defines the frequency at which a product will output only half the power of the signal that is connected to its input.

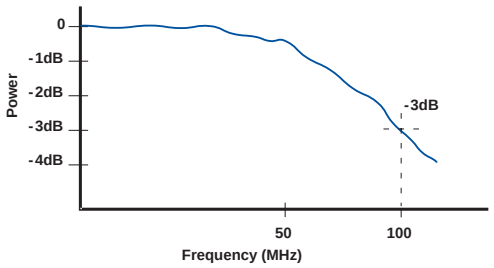

Figure 1

Figure 1 shows the frequency performance of a product that has a bandwidth of 100 MHz. If a 100 MHz, 1 volt peak-to-peak video signal is input to this product, the signal output will be 0.7 volts peak-to-peak. This is a 30% reduction of the video signal. The *"Bandwidth Rule of Thumb"* encourages the use of products with 200 to 300 MHz of video bandwidth for a 100 MHz signal. The logic behind this is to assure that the source signal is on the first 1/2 to 1/3 portion of the bandwidth curve, where losses are low or non-existent (*See Figure 2).*

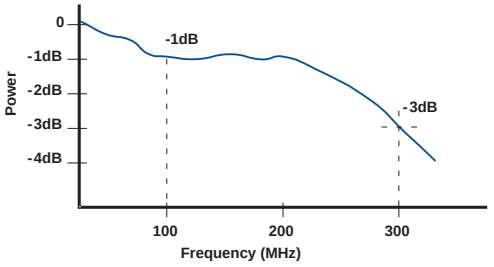

Figure 2

There are, however, loopholes in the *"Bandwidth Rule of Thumb."* Figure 3 shows a bandwidth curve from a product that specifies 400 MHz. As can be seen, the product meets its specified performance; however, there is considerable video loss around the 100 MHz point. The area where the loss occurs is in the range called the *"Usable Portion of the Bandwidth Curve,"* because this is where common industry resolutions, such as VGA (30 MHz) and SXGA (130 MHz), exist. Dropout in this portion of the bandwidth curve will visibly affect the video, even if a product otherwise performs to the 400 MHz (-3dB) specification. In this product catalog, there are performance specifications for matrix switchers that actually specify the video performance in this range as well as the minimum and maximum -3dB points.

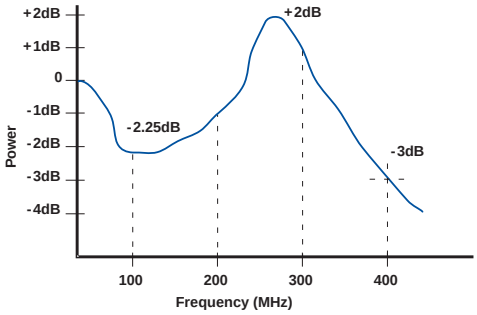

Figure 3

A good bandwidth curve will show little or no change to a video signal in the visible range, typically from 0 to 130 MHz, as indicated by a flat response in this portion of the curve. In this catalog there is a statement to the effect that an Extron matrix switcher will impact the video signal *"no more than +3dB or -1dB from 0 MHz to 130 MHz."* This specification is more critical and a more accurate description of the amount of visible loss expected than the standard bandwidth specification itself.

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Bandwidth & Matrix Switcher Performance (continued)...

Another significant region of visible information in a video signal's spectrum is the range of frequencies from 0 to 10 MHz. Believe it or not, the bandwidth loss in this low frequency range is often more visible than losses incurred in high frequency signals, for it is loss in this frequency range that is responsible for the effect referred to as smearing. This type of loss can be seen by using cables that don't have the proper characteristic impedance, or are simply too long. It is very important that the bandwidth performance in this frequency range is very flat. A loss of more than 0.25dB, as shown in Figure 4, will cause an image to exhibit flaws such as those seen in Figure 5. Because of this, the matrix switcher performance specifications range between 0 MHz to 10 MHz in each Extron matrix switcher.

In addition to having bandwidth specifications that are significant to the visible portion of a video signal, it is critical that such specifications pertain to the realistic use of a product. In matrix switcher specifications, this impact is found in the number of possible I/O configurations. A 2x1 switcher, which has two inputs and one output, has two possible video routing configurations. These are Input one to the output, or Input two to the output. A 2x2 matrix switcher has four possible routing configurations, and a 12x8 matrix switcher has many more possible routing configurations.

The bandwidth specification of a matrix switcher can change with each switch from one routing configuration to another. It would be meaningless to specify the bandwidth for one routing configuration if that specification were not accurate for another. Because of that, Extron specifies matrix switcher performance in the worst case scenario. This is typically one input to all outputs, often referred to as *"fully loaded."* If the term *"fully loaded"* doesn't appear on a matrix switcher specification, there is no reference on how the switcher was tested. The bandwidth in a real life installation may be considerably less. With the reference *"fully loaded,"* the real life performance meets or exceeds specified bandwidth regardless of how the switcher is configured.

Bandwidth is a significant element of a video system. Video bandwidth should be simple — if a problem with video isn't noticeable, there isn't one there. Users should demand realistic and meaningful specifications from the products they use, and use video products with bandwidth specifications in the visible range with good, low frequency response— tested under the worst of realistic working conditions.

Network analyzer measures the bandwidth of
The Extron Matrix 6400 Wideband Switcher

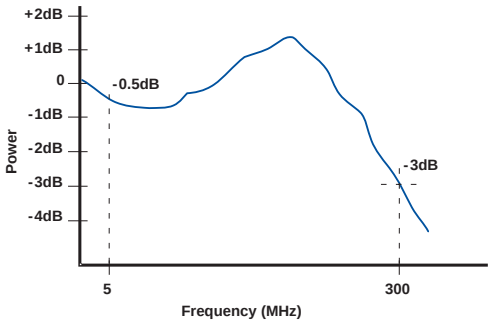

Figure 4

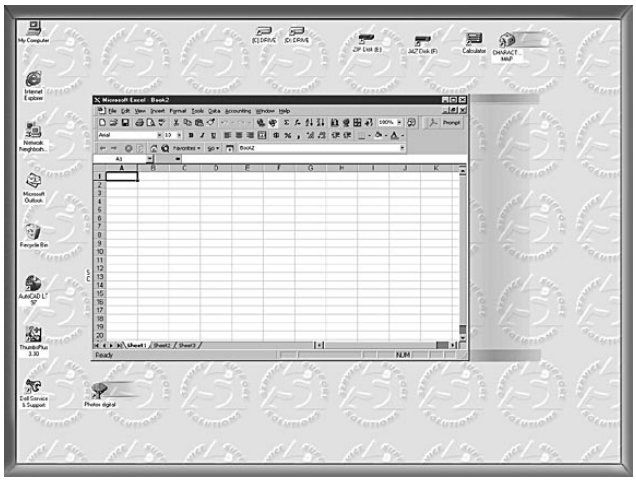

Figure 5

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Selecting the Right Matrix Switcher

STEP 1: WHAT ARE MATRIX SWITCHERS?

Matrix switchers route multiple audio/video sources to multiple audio/video destinations. These switchers let audio/video signals from a range of input sources—such as computers, cameras, DVD players, etc.—be displayed on various output sources, such as projectors, monitors, and codecs.

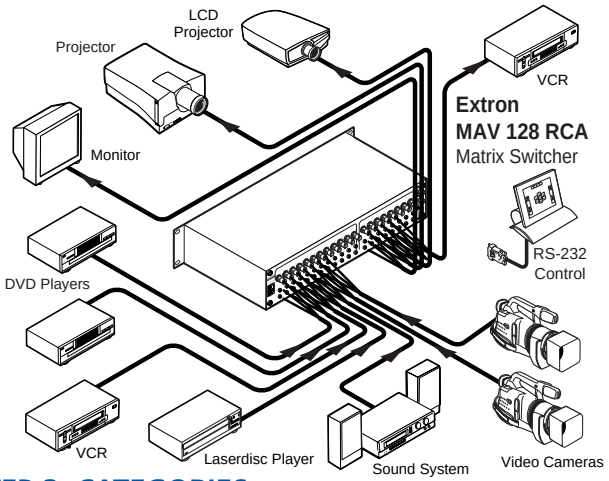
To select the right matrix switcher for a specific environment, there are several guidelines to consider:

1. Matrix switchers provide the ability to route any input to any output—or multiple outputs—at any time.
2. Depending on the model, matrix switchers can route composite video, S-video, HDTV/component video, RGsB/RGBS/RGBHV, and/or stereo audio (balanced/unbalanced).
3. Matrix switchers can accommodate multiple signal types within a single unit, but like inputs can only be routed to like outputs. For example, composite video inputs can only go to composite video outputs.

STEP 2: HOW ARE THEY USED?

Matrix switchers are used in such environments as corporate boardrooms, command and control centers, classrooms, restaurants, home theaters, and videoconference rooms.

Here's an example of how a matrix switcher can be used in a restaurant. Six audio/video sources and one audio-only source are being input to a composite video matrix switcher (MAV 128 RCA). These inputs can then be routed to one or more of the five display devices connected to the switcher. Restaurant patrons could then view a video source from a DVD player on two of the CRT projectors (see diagram below), while video from a camera and audio from the stereo is being displayed by the monitor at the same time. Switching different inputs to different outputs can be done on the fly with the push of a button.



STEP 3: CATEGORIES

Extron matrix switchers are available with a variety of features to meet the needs of different applications. Configurations range from 4x2 (four inputs by two outputs) to 128x128 (128 inputs by 128 outputs). For additional flexibility, inputs and outputs can be added to specific switcher lines (described as "modular") while they are in the field.

Extron offers several categories of matrix switchers to suit just about any given matrix switching application:

MMX Series: The Extron MMX Series VGA and Video Mini Matrix Switchers are part of the VersaTools™ line of compact, affordable products. Housed in 1U high, half rack width enclosures for easy integration into a variety of environments, the MMX Series accepts and distributes composite video, S-video, or VGA-UXGA and stereo audio (balanced/unbalanced) signals.

MAV Series: Designed for video applications that route composite, S-video, or HDTV/component video and stereo audio (balanced/unbalanced) signals. Provides 150 MHz (-3dB) video bandwidth, fully loaded.

Digital XPoint Series: The Extron Digital XPoint Series is a line of digital matrix switchers, ideal for switching multiple serial digital video signals (SDI) to multiple digital video devices in video post production studios, non-linear editing suites, and video broadcast studios.

MSV Series: The Inline MSV Series features VGA and stereo audio matrix switchers compatible with RGBHV, RGBS, RGsB, and component video signals. Provides 450 MHz (-3dB) video bandwidth, fully loaded.

CrossPoint Series: Designed for analog, high resolution computer-video applications using RGsB, RGBS, or RGBHV video signals and low resolution video. Provides stereo audio switching (balanced/unbalanced) and 200 or 300 MHz (-3dB), RGB video bandwidth, fully loaded.

CrossPoint Plus Series: Designed for the same types of signals as the CrossPoint Series, but with more video bandwidth. Provides stereo audio switching (balanced/unbalanced) and ultra-wideband 425 MHz (-3dB) RGB video bandwidth, fully loaded.

Matrix 50 Series: Configurable video matrix switchers designed for applications requiring expandable routers capable of switching any type of analog high resolution RGB and low resolution video signal. Provides stereo audio switching (balanced/unbalanced) and is available in an audio-only version. Any version with video provides 150 MHz (-3dB) video bandwidth, fully loaded.

Matrix 3200/6400 Series: Modular RGB and video matrix switchers designed for applications requiring expandable routers. Provides stereo audio switching (balanced/unbalanced). Available in four models with flexible configurations up to 64x64—wideband [430 MHz (-3dB) video bandwidth, fully loaded], sync, and audio-only versions.

Matrix 12800 Series with DSVP™: Modular RGB and video matrix switchers designed for extremely large applications requiring expandable routers. Provides stereo and mono audio switching (balanced/unbalanced). Available in three models with flexible configurations up to 128x128—wideband [375 MHz (-3dB) video bandwidth, fully loaded] sync, and audio-only versions.

ISM Series: The Extron ISM Series are Integration Scaling Matrix switchers with eight fully configurable inputs and two audio/video outputs that feature built-in scalers for both video outputs. Accepts many types of inputs including RGB, HDTV/component video, S-video, and/or composite video and stereo audio. The ISM Series can be found in the Scalers section of this catalog.

STEP 4: PERFORMANCE SPECIFICATIONS

Refer to the Matrix Switcher Cross-Reference to find the switcher that is right for your application.

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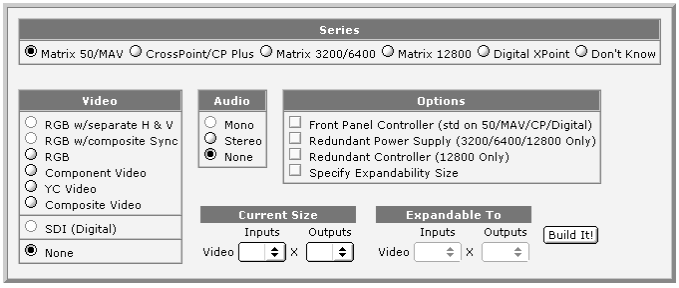
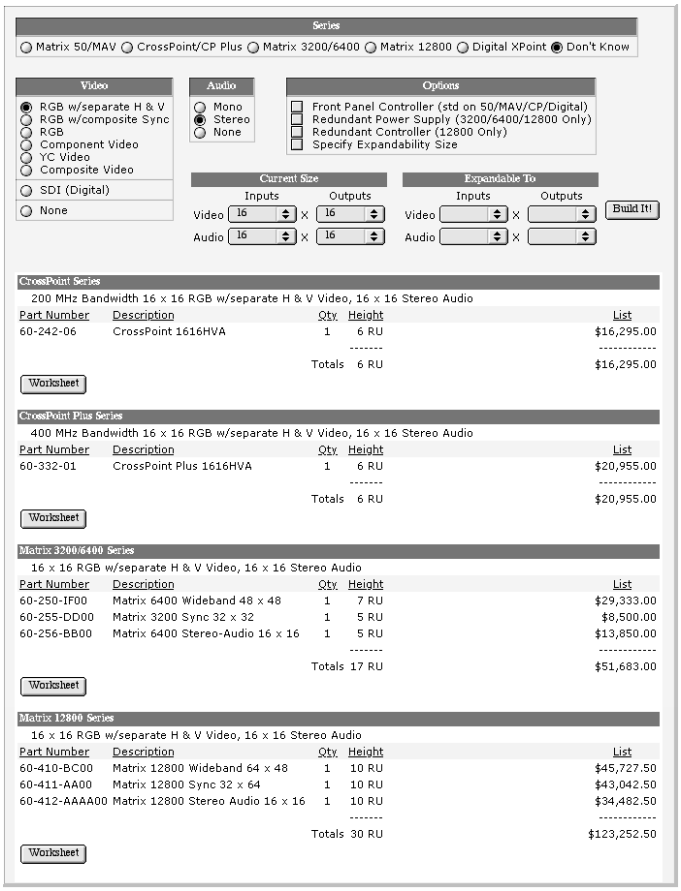
Matrix Builder

On the Extron Dealer-Only and Consultant-Only Web sites



Extron Matrix Builder Main Menu


Series
Matrix 50/MAV
CrossPoint/CP Plus
Matrix 3200/6400
Matrix 12800
Digital XPoint
Don't Know
Video
RGB w/separate H & V
RGB w/composite Sync
RGB
Component Video
YC Video
Composite Video
SDI (Digital)
None
Audio
Mono
Stereo
None
Options
Front Panel Controller (std on 50/MAV/CP/Digital)
Redundant Power Supply (3200/6400/12800 Only)
Redundant Controller (12800 Only)
Specify Expandability Size
Current Size
Inputs
Outputs
Video 16 x 16
Audio 16 x 16
Expandable To
Inputs
Outputs
Video
Audio
Build It!
CrossPoint Series
200 MHz Bandwidth 16 x 16 RGB w/separate H & V Video, 16 x 16 Stereo Audio
Part Number Description Qty Height List
60-242-06 CrossPoint 1616HVA 1 6 RU $16,295.00
Totals 6 RU $16,295.00
Worksheet
CrossPoint Plus Series
400 MHz Bandwidth 16 x 16 RGB w/separate H & V Video, 16 x 16 Stereo Audio
Part Number Description Qty Height List
60-332-01 CrossPoint Plus 1616HVA 1 6 RU $20,955.00
Totals 6 RU $20,955.00
Worksheet
Matrix 3200/6400 Series
16 x 16 RGB w/separate H & V Video, 16 x 16 Stereo Audio
Part Number Description Qty Height List
60-250-IF00 Matrix 6400 Wideband 48 x 48 1 7 RU $29,333.00
60-255-DD00 Matrix 3200 Sync 32 x 32 1 5 RU $8,500.00
60-256-BB00 Matrix 6400 Stereo-Audio 16 x 16 1 5 RU $13,850.00
Totals 17 RU $51,683.00
Worksheet
Matrix 12800 Series
16 x 16 RGB w/separate H & V Video, 16 x 16 Stereo Audio
Part Number Description Qty Height List
60-410-BC00 Matrix 12800 Wideband 64 x 48 1 10 RU $45,727.50
60-411-AA00 Matrix 12800 Sync 32 x 64 1 10 RU $43,042.50
60-412-AAAA00 Matrix 12800 Stereo Audio 16 x 16 1 10 RU $34,482.50
Totals 30 RU $123,252.50
Worksheet

Extron Matrix Builder Listing Choices

The Extron Matrix Builder allows you to custom configure an Extron matrix switcher to your exact requirements—online! Available 24 hours a day, 7 days a week through the Extron Dealer-Only and Consultant-Only Web sites, this program processes your requirements and automatically generates a list of Extron matrix switcher models that fulfill your specifications. The Matrix Builder is easy to use and conveniently provides list pricing, so the information you need is available right at your fingertips.

Extron matrix switchers are available with a variety of I/O configurations and features to meet the needs of different applications. With over 300 matrix switchers to choose from, the Matrix Builder program helps you select the best matrix switchers in terms of performance, cost-effectiveness, and versatility for your unique application. It can also present alternate solutions for consideration.

The Extron Dealer-Only and Consultant-Only Web sites are available to Extron dealers and consultants in every global market Extron serves: Japan, Asia, Europe, and North America. In addition to the Matrix Builder, these secure access sites offer many other exciting services, including 24-hour online ordering, current pricing views, order status updates, and shipment tracking. For more information or to set up an online account, contact your Extron Customer Support Representative.

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Matrix Switcher Cross Reference

	Bandwidth (MHz, @-3db) Fully Loaded	Maximum Inputs	Maximum Outputs	Ins & Outs: SDI Digital Video w/Enabled AES/EBU	Video Formats: HDTV Compatible	Composite Video (NTSC, PAL, SECAM)	S-video	Component Video (Y, R-Y, B-Y)	RGsB, RGCsBs, RGBs, & RGBHV	Balanced & Unbalanced Stereo Audio	Audio Mute	Adjustable Input Audio Gain/Attenuation	Adjustable Output Audio Level/Attenuation	Audio Breakaway	Features: Memory Presets (Room & Global)	Label Windows or Buttons for I/Os	Digital Sync Validation Processing (DSVP™)	I/O Breakaway	I/O Grouping	Vertical Interval Switching	Triple Action Switching™	RGB Mute	Optional LCD Front Panel Controller	QuickSwitch Controller (QS-FPC™)	Front Panel Security Lockout	Redundant Power Supply	Simple Instruction Set (SIS™)	RS-232 / RS-422 Control	IP Control	Rack Unit Height
ISM Series (Seamless Scaled RGB & Video)																														
ISM 182, ISM 482	N/A	8	2		ISM 482	•	•	•	•	•	•	•		•	•	•					•	•					•	•	•	3
Digital XPoint Series (Digital Video)																														
DXP 44 SDI, DXP 88 SDI	N/A	4,8	4,8	•						N/A	N/A	N/A	N/A	N/A	16	•				•					•			•	•	1
MSV Series (15 pin HD I/O connectors)																														
MSV0502	450	5	2					•	•	•	•	•		•	•												•		•		1
MSV0804	450	8	4					•	•	•	•	•		•	•												•		•		2
MAV 88 Series (Audio Video)																														
MAV 44 V	200	4	4			•				VIDEO ONLY					•					•					•	•		•	R		1
MAV 44 SV	200	4	4				•			S–VIDEO ONLY					•					•					•	•		•	R		1
MAV 44 AV	200	4	4			•				•	R	•	TWO	•	•					•					•	•		•	R		1
MAV 44 AV RCA	200	4	4			•				U	R	•	TWO	•	•					•					•	•		•	R		1
MAV 44 SVA	200	4	4				•			•	R	•	TWO	•	•					•					•	•		•	R		1
MAV 44 SVA RCA	200	4	4				•			U	R	•	TWO	•	•					•					•	•		•	R		1
MAV 48 V	200	4	8			•				VIDEO ONLY					•					•					•	•		•	R		1
MAV 48 SV	200	4	8				•			S–VIDEO ONLY					•					•					•	•		•	R		1
MAV 48 AV	200	4	8			•				•	R	•	TWO	•	•					•					•	•		•	R		1
MAV 48 AV RCA	200	4	8			•				U	R	•	TWO	•	•					•					•	•		•	R		1
MAV 48 SVA	200	4	8				•			•	R	•	TWO	•	•					•					•	•		•	R		1
MAV 48 SVA RCA	200	4	8				•			U	R	•	TWO	•	•					•					•	•		•	R		1
MAV 84 V	200	8	4			•				VIDEO ONLY					•					•					•	•		•	R		1
MAV 84 SV	200	8	4				•			S–VIDEO ONLY					•					•					•	•		•	R		1
MAV 84 AV	200	8	4			•				•	R	•	TWO	•	•					•					•	•		•	R		1
MAV 84 AV RCA	200	8	4			•				U	R	•	TWO	•	•					•					•	•		•	R		1
MAV 84 SVA	200	8	4				•			•	R	•	TWO	•	•					•					•	•		•	R		1
MAV 84 SVA RCA	200	8	4				•			U	R	•	TWO	•	•					•					•	•		•	R		1
MAV 88 V	200	8	8			•				VIDEO ONLY					•					•					•	•		•	R		1
MAV 88 SV	200	8	8				•			S–VIDEO ONLY					•					•					•	•		•	R		1
MAV 88 AV	200	8	8			•				•	R	•	TWO	•	•					•					•	•		•	R		1
MAV 88 AV RCA	200	8	8			•				U	R	•	TWO	•	•					•					•	•		•	R		1
MAV 88 SVA	200	8	8				•			•	R	•	TWO	•	•					•					•	•		•	R		1
MAV 88 SVA RCA	200	8	8				•			U	R	•	TWO	•	•					•					•	•		•	R		1
MMX Series																														
MMX 32 VGA A	300	3	2						•	•															•	•		•	R		1
MMX 42 AV	150	4	2			•				•		•		•											•	•		•	R		1
MMX 42 AV RCA	150	4	2			•				U		•		•											•	•		•	R		1
MMX 42 SVA	150	4	2				•			•		•		•											•	•		•	R		1
MMX 42 SVA RCA	150	4	2				•			U		•		•											•	•		•	R		1
MMX 62 AV	150	6	2			•				•		•		•											•	•		•	R		1
MMX 62 AV RCA	150	6	2			•				U		•		•											•	•		•	R		1
MMX 62 SVA	150	6	2				•			•		•		•											•	•		•	R		1
MMX 62 SVA RCA	150	6	2				•			U		•		•											•	•		•	R		1
MAV Series (Video)																														
MAV 62 Composite Video	150	6	2			•				•	R	•		•	0					•	N/A	N/A			•			•	R		1
MAV 62 S-video	150	6	2				•			•	R	•		•	0					•	N/A	N/A			•			•	R		1
MAV 84 & 128 RCA	150	8,12	4,8			•				U	R	•		•	12	•				•	N/A	N/A			•	•		•	•		2
MAV 168 & 1616 Composite Video /Audio	150	16	8,16			•				•	A	•		•	16	•				•	N/A	N/A			•	•		•	•		2
MAV 168 & 1616 S-video/Audio	150	16	8,16				•	•		•	A	•		•	16	•				•	N/A	N/A			•	•		•	•		3
MAV 168 & 1616 Component Video/Audio	150	16	8,16		•	•	•	•		•	A	•		•	16	•				•	N/A	N/A			•	•		•	•		4
MAV 168 & 1616 Audio	N/A	16	8,16		AUDIO ONLY					•	R	•		•	16	•				N/A	N/A	N/A			•	•		•	•		2
MAV 2412 & 2424 Composite Video w/Audio	150	24	12,24			•				•	A	•	•	•	132	•				•	N/A	N/A			•	•	•	•	•	•	5
MAV 2412 & 2424 Composite Video	150	24	12,24			•						•		•	132	•				•	N/A	N/A			•	•	•	•	•	•	5
MAV 2412 & 2424 Audio	N/A	24	12,24		AUDIO ONLY					•	R	•	•	•	132	•				N/A	N/A	N/A			•	•	•	•	•	•	5
MAV 3216 & 3232 Composite Video w/Audio	150	32	16,32			•				•	A	•	•	•	132	•				•	N/A	N/A			•	•	•	•	•	•	5
MAV 3216 & 3232 Composite Video	150	32	16,32			•						•		•	132	•				•	N/A	N/A			•	•	•	•	•	•	5
MAV 3216 & 3232 Audio	N/A	32	16,32		AUDIO ONLY					•	R	•	•	•	132	•				N/A	N/A	N/A			•	•	•	•	•	•	5
CrossPoint Series (Wideband RGB & Video)																														
CrossPoint 42HVA	300	4	2		•	•	•	•	•	•	R	•		•	0							R			•			•	R		1
CrossPoint 84/88 HV/HVA	200	8	4,8		•	•	•	•	•	•	•	•		•	12	•				N/A		R			•	•		•	•		3
CrossPoint 124/128 HV/HVA	200	12	4,8		•	•	•	•	•	•	•	•		•	12	•				N/A		R			•	•		•	•		3
CrossPoint 168/1616 HV/HVA	200	16	8,16		•	•	•	•	•	•	•	•		•	16	•				N/A		R			•	•		•	•		6
CrossPoint Plus Series (Ultra-Wideband RGB & Video)																														
CrossPoint Plus 84/88 HV/HVA	425	8	4,8		•	•	•	•	•	•	•	•		•	16	•	•		•	N/A	•	R			•	•		•	•		3
CrossPoint Plus 124/128 HV/HVA	425	12	4,8		•	•	•	•	•	•	•	•		•	16	•	•		•	N/A	•	R			•	•		•	•		3
CrossPoint Plus 164/168 HV/HVA	425	16	8,16		•	•	•	•	•	•	•	•		•	16	•	•		•	N/A	•	R			•	•		•	•		6
CrossPoint Plus 2412/2424 HV/HVA	425	24	12,24		•	•	•	•	•	•	•	•	•	•	132	•	•		•	N/A	•	R			•	•	•	•	•	•	8,10
CrossPoint Plus 3216/3232 HV/HVA	425	32	16,32		•	•	•	•	•	•	•	•	•	•	132	•	•		•	N/A	•	R			•	•	•	•	•	•	8,10
Modular Design & Field Expandable Series																														
Matrix 50	150	8,12	4,8		•	•	•	•		•	R	•		•	12	•				•					•			•	•		2
Matrix 3200 Wideband	430	32	32		•	•	•	•	•	N/A	N/A	N/A	N/A	•	132			•		N/A	•	•	•				OPT	•	•		5
Matrix 3200 Video, Matrix 6400 Video	150	32,64	32,64		•	•	•	•		N/A	N/A	N/A	N/A	•	132			•		•	•	•	•				OPT	•	•		5
Matrix 6400 Wideband	430	64	64		•	•	•	•	•	N/A	N/A	N/A	N/A	•	132			•		N/A	•	•	•				OPT	•	•		7
Matrix 6400 Audio, Matrix 12800 Audio	N/A	64,128	64,128		AUDIO ONLY					•	•	•	N/A		132			•		N/A	N/A	N/A	•				OPT	•	•	12800	5,10
Matrix 12800 Wideband	375	128	128		•	•	•	•	•	N/A	N/A	N/A	N/A	•	384		•	•	•	•	•	•	•				OPT	•	•	•	10

Matrix Switcher Cross Reference Legend

CrossPoint Switchers are offered with and without audio. "A" indicates audio, and the audio features apply.

- • = Product has feature
- A = Applies to the audio model only
- R = RS-232 only
- U = Unbalanced audio only
- N/A = Not Applicable
- OPT = Optional
- TWO = 2 level switchable, RS-232 only

MMX Series

VGA with Audio & Video with Audio Mini Matrix Switchers

SIS™ Simple Instruction Set

VERSA™ TOOLS

NEW

MMX 42 AV RCA

MMX 62 SV RCA

MMX 32 VGA A

DESCRIPTION

The Extron **MMX Series** of VGA and Video Matrix Switchers are economical, compact units that are effective in small installations, such as boardrooms, classrooms, and home theatres. The intuitive front panels with tactile buttons and LED indicators enable easy control of inputs and outputs for non-technical users. MMX matrix switchers are housed in 1U high, half rack width VersaTools™ enclosures.

Composite Video and Stereo Audio Matrix Switchers

The MMX Series of Composite Video and Stereo Audio (balanced/unbalanced) Switchers come in 4x2 and 6x2 models, and are suitable for applications such as site surveillance with multiple cameras and home theaters. Features include genlock to input one, which allows all signals to switch at the same vertical interval timing for smooth, seamless transition; front panel security lockout for environments where easy access is undesireable; quad standard for switching between NTSC 3.58, NTSC 4.43, PAL, and SECAM for worldwide compatibility; and RS-232 for control via a third party control system.

S-Video and Stereo Audio Matrix Switchers

The MMX Series of S-video and Stereo Audio Switchers (balanced/unbalanced) come in 4x2 or 6x2 models and are suitable for classrooms and home theaters. Features include genlock to input one, which allows all signals to switch at the same vertical interval timing for smooth, seamless transitions; front panel security lockout for environments where easy access is undesireable; quad standard for switching between NTSC 3.58, NTSC 4.43, PAL, and SECAM for worldwide compatibility; and RS-232 for control via a third party control system.

VGA-UXGA and Audio Matrix Switcher

The MMX 32 VGA A 3 x 2 Video Matrix Switcher with Audio allows users to easily switch between two computer video and stereo audio signals. The MMX 32 VGA A accepts VGA-UXGA and unbalanced stereo audio input signals and features three 15-pin HD female video input connectors and three 3.5mm female audio input connectors, allowing direct connection to computer video cards and sound cards using a standard VGA and audio cable. Output one is optimized for a local or preview monitor and includes a 15-pin HD video output along with a 3.5mm unbalanced audio output for driving local powered speakers or a recording device. Output two is optimized for connection to the main presentation display and house sound system and features a 5-BNC output along with a 5-pin captive screw connector that can be wired for balanced or unbalanced stereo audio. The unit can also be controlled through RS-232 by a third party control system or by contact closure with tally output, which allows the user to control both outputs from remote locations.

FEATURES

- **150 MHz (-3dB) bandwidth, fully loaded –** Ensures switching and distribution of most signals without degradation. The ratings are worst case specifications, i.e., the MMX Series provide 150 MHz (-3dB) at full performance capacity — when one input signal drives all outputs.
- **300 MHz (-3dB) bandwidth, fully loaded (MMX 32 VGA A only)–** Ensures switching and distribution of most signals without degradation. The ratings are worst case specifications, i.e., the MMX 32 VGA A provides 300 MHz (-3dB) at full performance capacity — when one input signal drives both outputs.
- **Buffered I/O –** Each input and output is individually buffered to provide maximum performance and virtually no crosstalk.
- **View I/O mode (MMX 42 & MMX 62 only) –** Allows users to easily see which individual inputs and outputs are actively connected. Available from the front panel or RS-232 control.
- **Captive screw or RCA audio connections –** The MMX Series AV and SVA matrix switcher models provide captive screw input and output connectors for balanced or unbalanced stereo audio signals. The RCA models feature RCA female connectors and are compatible with unbalanced audio signals only.
- **Input audio gain and attenuation (adjustable via RS-232 or front panel) –** The Extron MMX 42/62 Series allows users to set the level of audio gain or attenuation (-18dB to +24dB). Individual input audio levels may be adjusted so there are no noticeable volume differences when switching between sources.
- **Audio breakaway –** The MMX Series matrix switchers (except the MMX 32 VGA A) provide the capability to break away an audio signal from its corresponding video signal. Audio breakaway switching can be done via front panel control or RS-232 control.
- **RS-232 control –** A rear panel RS-232 control port provides connection of the MMX Series to a third party control system.
- **Simple Instruction Set (SIS™) –** Extron SIS is a set of basic ASCII code commands that provide simple control through a third party control system. Instead of programming in long, obscure strings of code, SIS makes it easy to operate an Extron product using RS-232 control.
- **Rack-mountable –** The MMX Series Switchers are housed in 1U, half rack width rugged metal enclosures and can be rack-mounted using an optional rack shelf.
- **External international power supply included –** Provides worldwide power compatibility. (part# 70-055-01, see page 439)
- **MMX 32 AAP and MMX 32 MAAP remote control –** The MMX 32 MAAP contains input selection buttons and LED indicators to control an MMX 32 VGA A matrix switcher. The MMX 32 MAAP is a single space Mini Architectural Adapter Plate (MAAP) that can be installed in any Extron MAAP mounting panel. The MMX 32 MAAP enables a user to remotely select an input to route to one of the matrix switcher outputs.

MMX 32 AAP

MMX 32 MAAP

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MMX Series (continued)...

MODEL	PART #
Composite Video and Stereo Audio Switchers	
MMX 42 AV	60-556-21
MMX 42 AV RCA	60-556-31
MMX 62 AV	60-557-21
MMX 62 AV RCA	60-557-31
S-Video and Stereo Audio Switchers	
MMX 42 SVA	60-556-22
MMX 42 SVA RCA	60-556-32
MMX 62 SVA	60-557-22
MMX 62 SVA RCA	60-557-32
VGA-UXGA and Audio Switcher	
MMX 32 VGA A	60-565-01

OPTIONAL ACCESSORIES

IPL T S2 .....60-544-01 (page 240)
MMX 32 AAP (gray, black, or white) .....70-277-X1 (page 104)
MMX 32 MAAP (black or white) .....70-277-X2 (page 116)

SPECIFICATIONS

VIDEO

- Routing
  - MMX 32 ..... 3 x 2 matrix
  - MMX 42 Series ..... 4 x 2 matrix
  - MMX 62 Series ..... 6 x 2 matrix
- Gain ..... Unity
- Bandwidth
  - MMX 32 ..... 300 MHz (-3dB), fully loaded
    0 – 10 MHz — no more than +0.1dB to -0.1dB
    0 – 130 MHz — no more than +2dB to -0.1dB
  - MMX 42/62 Series ..... 150 MHz (-3dB), fully loaded
    0 - 10 MHz — no more than 0.1dB to -0.1dB
    0 - 30 MHz — no more than 0.5dB to -0.5dB
- Phase between I/Os (42/62 Series) ..... <1.28° at 3.58 MHz
- Differential phase error (42/62) ..... 0.1° at 3.58 MHz and 4.43 MHz
- Differential gain error (42/62) ..... 0.1% at 3.58 MHz and 4.43 MHz
- Max. propagation of delay (42/62)..... 5 ns typical (±1 ns)
- Crosstalk
  - MMX 32 ..... -55dB @ 10 MHz, -45dB @ 30 MHz, -37dB @ 100 MHz
  - MMX 42/62 Series ..... -50dB @ 5 MHz
- Switching speed..... 200 ns (max.)

VIDEO INPUT

- Number/signal type
  - MMX 32 ..... 3 RGBHV, RGBS, RGsB, RsGsBs
  - MMX 42 & MMX 62 composite video models 4 or 6 composite video
  - MMX 42 and MMX 62 S-video models .... 4 or 6 S-video
- Connectors
  - MMX 32 ..... (3) 15-pin HD female
  - MMX 42 & MMX 62 composite video models 4 or 6 female BNC
  - MMX 42 and MMX 62 S-video models .... 4 or 6 female 4-pin mini DIN
- Nominal level..... 1V p-p for Y of S-video, and for composite video
  0.7V p-p for RGB
  0.3V p-p for C of S-video
- Minimum/maximum levels
  - MMX 32 ..... Analog: -0.5V to 2.0V p-p with no offset at unity gain
  - MMX 42/62 Series ..... Analog: 0.5V to 2.0V p-p with no offset
- Impedance ..... 75 ohms
- Horizontal frequency (MMX 32) ..... 15kHz to 145 kHz
- Vertical frequency (MMX 32) ..... 30 Hz to 170 Hz
- Return loss
  - MMX 32 ..... <-42dB @ 5 MHz
  - MMX 42/62 Series ..... <-30dB @ 5 MHz
- Maximum DC offset
  - MMX 32 ..... 4.0V
  - MMX 42/62 Series 1.5V

VIDEO OUTPUT

- Number/signal type
  - MMX 32 ..... 2 analog RGBHV, RGBS, RGsB
  - MMX 42 & MMX 62 composite video models 2 composite video
  - MMX 42 and MMX 62 S-video models .... 2 S-video
- Connectors
  - MMX 32 ..... (1) 15-pin HD female
    5 BNC female
  - MMX 42 & MMX 62 composite video models 2 female BNC
  - MMX 42 and MMX 62 S-video models .... 2 female 4-pin mini DIN
- Nominal level..... 1V p-p for Y of S-video, and for composite video
  0.7V p-p for RGB
  0.3V p-p for C of S-video
- Minimum/maximum levels
  - MMX 32 ..... 0.3V to 2.0V p-p
  - MMX 42/62 ..... 0V to 2.0V p-p
- Impedance ..... 75 ohms
- Return loss ..... -30dB @ 5 MHz
- DC offset ..... ±5mV maximum with input at 0 offset
- Switching type ..... Vertical interval

SYNC — FOR MMX 32, UNLESS OTHERWISE INDICATED

- Input type ..... RGBHV, RGBS, RGsB, RsGsBs
- Output type ..... RGBHV, RGBS, RGsB
- Standards (MMX 42/62 Series)..... NTSC 3.58, NTSC 4.43, PAL, SECAM
- Input level ..... 2.5V to 5.0V p-p, 4.0V p-p normal
- Output level ..... AGC to TTL: 4V to 5V p-p, unterminated
- Input impedance ..... 10k ohms
- Output impedance ..... 75 ohms
- Max input voltage ..... 5V p-p
- Max. propagation delay ..... 30 ns
- Max. rise/fall time ..... 4.2 ns
- Polarity
  - RGBHV ..... when RGBHV is input, polarity follows input; otherwise negative
  - RGBs, RGsB..... negative

AUDIO

- Routing
  - MMX 32 ..... 3 x 2 stereo matrix
  - MMX 42 Series ..... 4 x 2 stereo matrix
  - MMX 62 Series ..... 6 x 2 stereo matrix
- Gain — MMX 32
  - Program output..... Unbalanced output: +6dB; balanced output: +12dB
  - Local output ..... Unbalanced output: 0dB
- Gain — MMX 42/62 Series
  - Captive screw models ..... Unbalanced output: -6dB; balanced output: 0dB
  - RCA connector models ..... Unbalanced output: 0dB
- Frequency response ..... 20 Hz to 20 kHz, ±0.05dB
- THD + Noise
  - MMX 32 ..... 0.03% @ 1 kHz, 0.3% @ 20kHz nominal level
  - MMX 42/62 Series ..... 0.03% @ 1 kHz at rated nominal level
- S/N ..... >90dB, at rated maximum output
- Crosstalk ..... <-80dB @ 1 kHz, fully loaded
- Stereo channel separation ..... >90dB @ 1 kHz
- CMRR ..... >75dB @ 20 Hz to 20 kHz

AUDIO INPUT

- Number/signal type
  - MMX 32 ..... 3 stereo, PC level, unbalanced
  - MMX 42/62 Series captive screw models.. 4 or 6 stereo, balanced/unbalanced
  - MMX 42/62 Series RCA connector models 4 or 6 stereo, unbalanced
- Connectors
  - MMX 32 ..... (3) 3.5 mm mini stereo jacks
  - MMX 42/62 Series captive screw models.. (4 or 6) 3.5 mm captive screw connectors, 5 pole
  - MMX 42/62 Series RCA connector models.. 4 or 6 pairs of female RCA connectors
- Impedance
  - MMX 32 ..... 25 kohms balanced/unbalanced, DC coupled
  - MMX 42/62 Series ..... >10 kohms unbalanced/balanced, DC coupled
- Nominal level..... -10dBV (316mV)
- Maximum level
  - MMX 32 ..... +8.5dBu, (unbalanced) at 1%THD+N
  - MMX 42/62 Series ..... +19.5dBu, (balanced or unbalanced) at 1%THD+N
- Input gain adjustment (MMX 42/62 Series) .. –18dB to +24dB, adjustable per input via RS-232 only

CONTINUED ON NEXT PAGE...

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MMX Series (continued)...

AUDIO OUTPUT

Number/signal type
- MMX 32 & MMX 42/62 Series captive screw models ..... 2 stereo, balanced/unbalanced
- MMX 42/62 Series RCA connector models.. 2 stereo, unbalanced

Connectors
- MMX 32 ..... (1) 3.5 mm mini stereo audio jack (unbalanced) (1) 3.5 mm captive screw connector, 5 pole
- MMX 32 & MMX 42/62 Series captive screw models ..... (2) 3.5 mm captive screw connectors, 5 pole
- MMX 42/62 Series RCA connector models.. 2 pairs of female RCA connectors

Impedance ..... 50 ohms unbalanced, 100 ohms balanced
Gain error ..... ±0.1dB channel to channel
Maximum level (Hi-Z)
- MMX 32 program audio and MMX 42/62 Series ..... >+21dBu, balanced or unbalanced at stated %THD+N

Maximum level (600 ohm)
- MMX 32 program audio ..... >+14dBm, balanced or unbalanced at stated %THD+N
- MMX 42/62 models ..... >+15dBm, balanced or unbalanced at stated %THD+N

NOTE: *0dBu = 0.775 volts (RMS).*

CONTROL/REMOTE — SWITCHER

Serial control port
- MMX 32 ..... RS-232, 9-pin female D connector
- MMX 42/62 Series ..... RS-232, female 3.5 mm captive screw connector, 3-pole

Contact closure (MMX 32 only) ..... 9-pin female D connector (also used as the serial control port)
Program control ..... Extron's control program for Windows®
Extron's Simple Instruction Set™ – SIS™

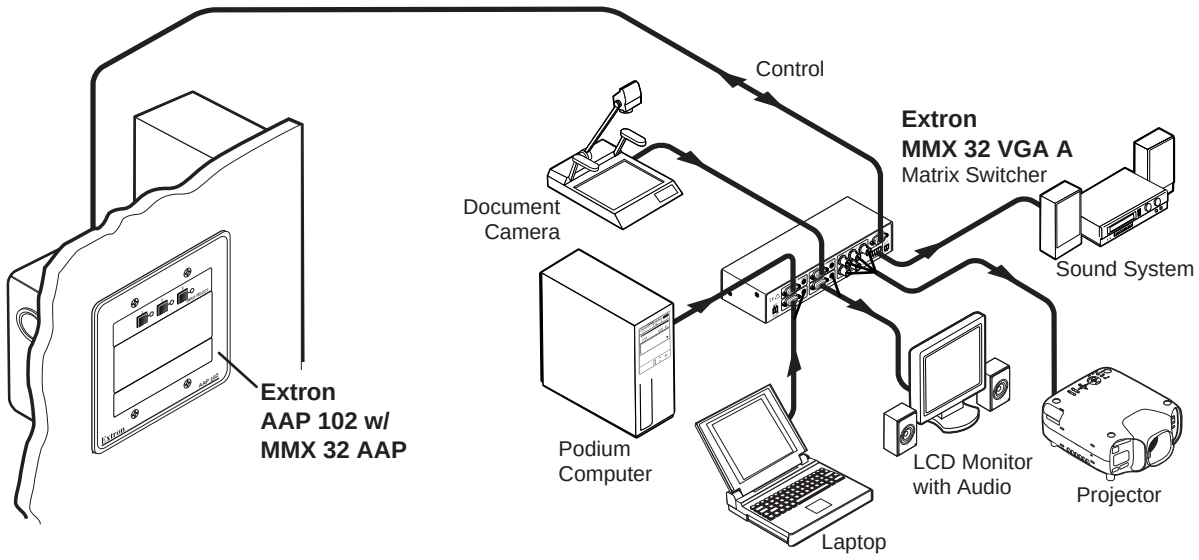
GENERAL

Power ..... 100VAC to 240VAC, 50/60 Hz, external, autoswitchable; to 12VDC, 1 A power supply.
- MMX 32 ..... 15 watts, product requires 0.7 A.
- MMX 42/62 Series ..... 6 watts, product requires 0.5 A.

Rack mount ..... Yes, with optional rack shelf, part #60-190-01 or #60-190-20; also furniture mountable with optional under-desk mounting kit #70-212-01
Enclosure type ..... Metal
Enclosure dimensions ..... 1.75" H x 8.75" W x 3.0" D (1U high, half rack width) 4.4 cm H x 22.2 cm W x 7.6 cm D (Depth excludes connectors.)
Product weight
- MMX 32 ..... 2.5 lbs (1.1 kg)
- MMX 42/62 Series ..... 4.0 lbs (1.8 kg)

Shipping weight ..... 5 lbs (2.3 kg)
Listings/Compliances ..... UL, CUL, CE, FCC Class A , VCCI, AS/NZS, ICES
Warranty ..... 3 years parts and labor

APPLICATION



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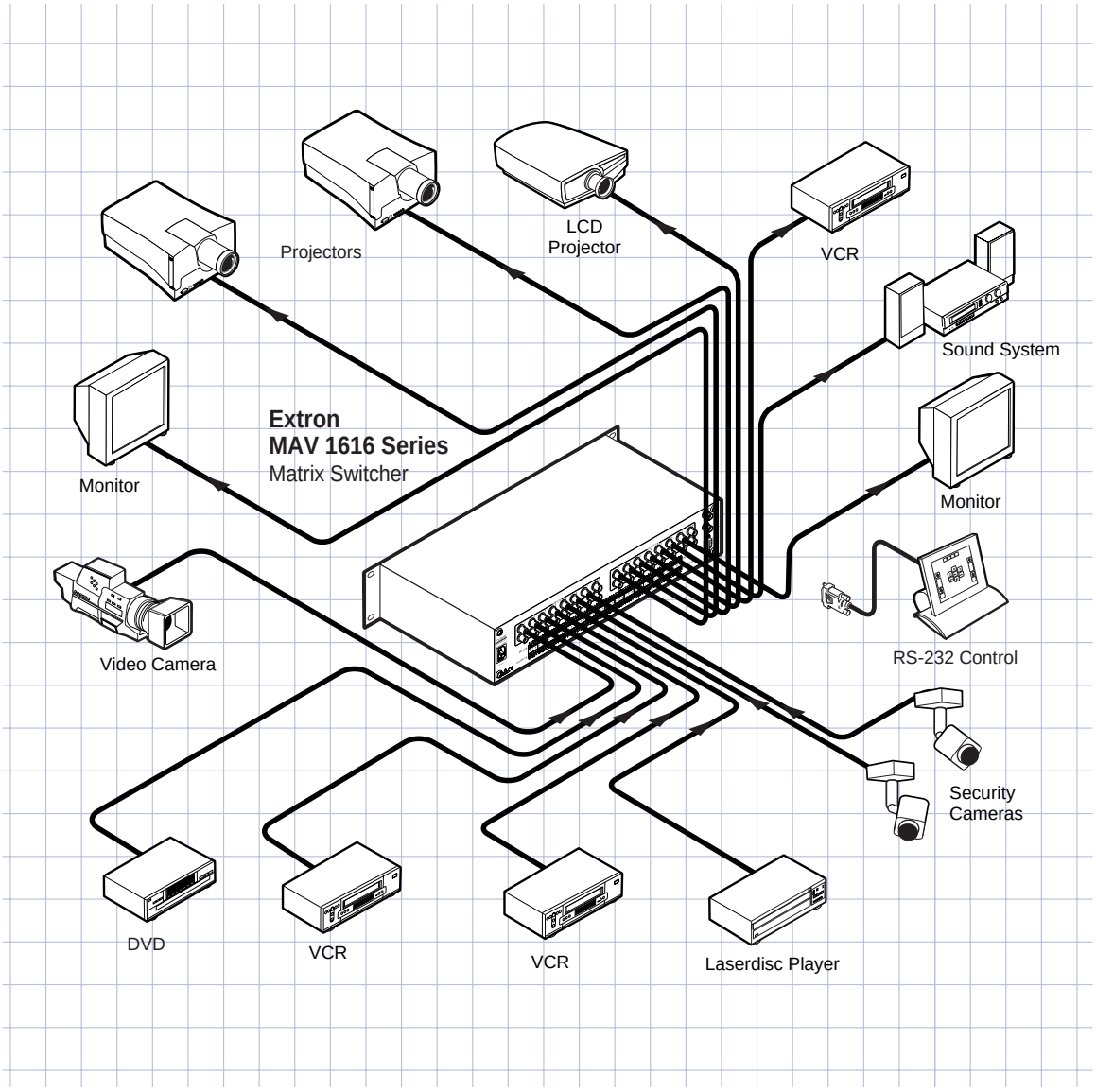

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MAV Series

Composite, S-Video, HDTV/Component, and/or Stereo Audio Matrix Switchers

IP LINK™ SIS™ Simple Instruction Set

DESCRIPTION

The Extron **MAV Series** Matrix Switchers are designed for applications that route composite video, S-video, HDTV/component video, and/or stereo audio (balanced/unbalanced) signals. The versatile MAV Series routes one or more independent NTSC, PAL, or SECAM video and/or stereo audio sources to one or more outputs. The MAV Series switchers are off-the-shelf solutions, ideal for a wide range of matrix switching applications. Corporate boardrooms, command and control centers, museums, university classrooms, sports bars, videoconferencing rooms, and home theaters are all common matrix switching environments where a MAV Series switcher is effective.

The switchers in the MAV Series are available in a variety of fixed configurations to match the input/output requirements of many applications. The MAV Series offers nine input/output options for composite video and stereo audio signals, three S-video and stereo audio I/O configurations, and two HDTV/component video and stereo audio versions. Each 16x8 and larger model in the MAV Series is also available in a video-only version. In addition, there are six stereo audio only versions.

FEATURES

- **150 MHz (-3dB) video bandwidth, fully loaded–** Ensures flawless switching and distribution of signals without signal degradation. The 150 MHz (-3dB) is a worst case specification, i.e., the MAV Matrix Switcher provides 150 MHz (-3dB) at full performance capacity when one input signal drives all outputs. MAV 44, 48, 84, and 88 models feature 200 MHz (-3dB) video bandwidth, fully loaded.
- **Video genlock and vertical interval switching–** Broadcast quality NTSC, PAL, or SECAM video genlock capabilities allow for vertical interval switching. This enables smooth, seamless transitions when switching between inputs.
- **Quad-standard–** MAV Series Matrix Switchers are capable of switching NTSC 3.58, NTSC 4.43, PAL, and SECAM video (quad standard) for worldwide compatibility.
- **Balanced and unbalanced audio–** Accepts both balanced and unbalanced stereo audio signals on 3.5 mm captive screw connectors (audio-only versions). The composite video and RCA audio switchers only accept unbalanced stereo audio signals on RCA connectors.
- **Input audio gain and attenuation–** Balances all audio inputs so there is no noticeable difference between volume levels. Adjustments can be made directly from the front panel or through RS-232 control, input by input.
- **Audio breakaway–** Provides the capability to break away an audio signal from its corresponding video signal. Audio breakaway switching can be done via the front panel or RS-232 remote.
- **QuickSwitch Front Panel Controller (QS-FPC™)–** The QuickSwitch FPC feature allows for touch-of-a-button input and output selection. Extron QuickSwitch technology eliminates the learning curve usually associated with switching the inputs and outputs of a matrix switcher by using a tactile front panel button for every input and output.
- **Front panel I/O label windows–** I/O buttons may easily be labeled by any Brother® P-Touch labeler or Extron label software, which ships with every Extron matrix switcher. Each input and output can be labeled with names, alphanumeric characters, or even color bitmaps for easy and intuitive input and output selection (except smaller 1U high models).
- **View I/O mode–** Allows users to easily see which individual inputs and outputs are actively connected. Available from the front panel or RS-232 control (except the 6x2 composite video and S-video switchers).
- **Global presets–** These store commonly used switching configurations. Any preset may be recalled from the front panel or RS-232 control. When a preset is recalled, all the new I/O connections occur simultaneously. This is also called a salvo (not available on MAV 62 models).
- **RS-232 and RS-422 control–** A rear panel, RS-232 and RS-422 control port provides connection of the MAV Series Switchers to a third party control system. The Extron Simple Instruction Set (SIS™) allows for quick and easy programming. (RS-422 not available on the smaller 1U high models.)
- **Simple Instruction Set (SIS)–** Extron's SIS is a set of basic ASCII code commands that provide simple control through a third party control system. Instead of programming in long, obscure strings of code, the SIS makes it easy to operate an Extron product using RS-232 or RS-422 control.
- **IR Control –** Switcher operation is controlled via the optional IR 501 remote control (MAV 44, MAV 48, MAV 84, and MAV 88 models only) or the front panel.
- **Control software–** For RS-232 or RS-422 remote control from a PC, Extron ships our Windows®-based control software with every matrix switcher. This icon-driven software uses a graphical, drag-and-drop interface to make I/O configuration and other customization functions simple and convenient. This software also offers an emulation mode for configuration of an offsite matrix switcher; the I/O configuration may then be saved for future downloading to the matrix switcher.
- **MCP 1000 and MKP 1000 control–** Utilizing the MCP 1000 Master Control Panel and any combination of MCP 1000 slave control panels or MKP 1000 control keypads offers the flexibility to control a MAV Matrix Switcher from a remote location. Each MCP 1000 panel may be used for one-button switching for a particular output and selecting global presets. Each MKP 1000 keypad may be used to select a different input or preset.
- **Front panel security lockout–** If a MAV Series Switcher is installed in an unsecured environment where easy access is undesirable, a security lock-out feature may be implemented. During lock-out mode, a special button combination is required to operate the front panel controller..
- **Internal international power supply–** The 100-240VAC, 50/60Hz, autoswitchable, internal power supply provides worldwide power compatibility.

IR 501

Exclusive to larger models (24x12 to 32x32 sizes):

- **IP Link™ (Ethernet) –** An IP integration technology developed by Extron specifically engineered to meet the needs of professional A/V environments, which enables the MAV Series to be controlled and proactively monitored over a LAN, WAN, or the Internet. An intuitive Web interface is also included for such common functions as I/O switching, system control, and online diagnostics and monitoring.
- **Web Page Serving Capabilities –** Extron IP Link provides web hosting with online pages for full functionality and monitoring of the product via any web browser. In addition, custom web pages can be produced with any off-the-shelf web page development software program to create your own HTML pages or java applets.
- **Downloadable firmware updates –** The newest firmware can be conveniently downloaded from the Extron Web site. Updates for new features and capabilities can be easily upgraded through the RS-232 and RS-422 or Ethernet port.
- **Audio output volume adjustment –** Output volume control adjustment (0-100%) is available via the front panel or RS-232 control. Audio output levels can be set at different levels through the switcher feeding the audio amplifier, eliminating the need for a pre-amplifier.
- **Redundant power supplies –** Primary and back-up power supplies for both positive and negative DC voltages are internally mounted. The primary power supply system is configured to support automatic fail-over switch to a hot spare power supply. This means no loss of functionality should the primary power supply fail.
- **Back-Lit I/O Selection buttons –** Input and output buttons are easily identifiable using back-lit buttons with clear overlay labels, enabling simple front panel operation.

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MAV Series (continued)...

MAV 88 AV
Composite Video & Stereo Audio

Composite Video Matrix Switchers

			Part Number
NEW	MAV 44 V	4x4 Composite Video	60-553-01
NEW	MAV 48 V	4x8 Composite Video	60-605-01
NEW	MAV 84 V	8x4 Composite Video	60-554-01
NEW	MAV 88 V	8x8 Composite Video	60-555-01
	MAV 168 V	16x8 Composite Video	60-329-02
	MAV 1616 V	16x16 Composite Video	60-240-05
	MAV 2412 V	24x12 Composite Video	60-474-02
	MAV 2424 V	24x24 Composite Video	60-472-02
	MAV 3216 V	32x16 Composite Video	60-475-02
	MAV 3232 V	32x32 Composite Video	60-473-02

MAV 2412 AV
Composite Video & Stereo Audio

Composite Video & Stereo Audio Matrix Switchers

			Part Number
NEW	MAV 44 AV RCA	4x4 Composite Video & Audio (RCA)	60-553-31
NEW	MAV 44 AV	4x4 Composite Video & Audio	60-553-21
NEW	MAV 48 AV RCA	4x8 Composite Video & Audio (RCA)	60-605-31
NEW	MAV 48 AV	4x8 Composite Video & Audio	60-605-21
	MAV 62 AV	6x2 Composite Video & Audio	60-215-01
NEW	MAV 84 AV RCA	8x4 Composite Video & Audio (RCA)	60-554-31
NEW	MAV 84 AV	8x4 Composite Video & Audio	60-554-21
NEW	MAV 88 AV RCA	8x8 Composite Video & Audio (RCA)	60-555-31
NEW	MAV 88 AV	8x8 Composite Video & Audio	60-555-21
	MAV 128 AV RCA	12x8 Composite Video & Audio (RCA)	60-238-04
	MAV 168 AV	16x8 Composite Video & Audio	60-329-01
	MAV 1616 AV	16x16 Composite Video & Audio	60-240-04
	MAV 2412 AV	24x12 Composite Video & Audio	60-474-01
	MAV 2424 AV	24x24 Composite Video & Audio	60-472-01
	MAV 3216 AV	32x16 Composite Video & Audio	60-475-01
	MAV 3232 AV	32x32 Composite Video & Audio	60-473-01

MAV 3232 AV
Composite Video & Stereo Audio

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MAV Series (continued)...

MAV 1616 SVA
S-Video & Stereo Audio

S-Video & Stereo Audio Matrix Switchers

S-Video Matrix Switchers			Part Number
MAV 44 SV	4x4	S-Video	60-553-02
MAV 48 SV	4x8	S-Video	60-605-02
MAV 84 SV	8x4	S-Video	60-554-02
MAV 88 SV	8x8	S-Video	60-555-02
MAV 168 SV	16x8	S-Video	60-364-02
MAV 1616 SV	6x16	S-Video	60-365-02

MAV 84 SVA RCA
S-Video & Stereo Audio (RCA)

S-Video & Stereo Audio Matrix Switchers			Part Number
MAV 44 SVA RCA	4x4	S-Video & Audio (RCA)	60-553-32
MAV 44 SVA	4x4	S-Video & Audio	60-553-22
MAV 48 SVA RCA	4x8	S-Video & Audio (RCA)	60-605-32
MAV 48 SVA	4x8	S-Video & Audio	60-605-22
MAV 62 SVA	6x2	S-Video & Audio	60-419-01
MAV 84 SVA RCA	8x4	S-Video & Audio (RCA)	60-554-32
MAV 84 SVA	8x4	S-Video & Audio	60-554-22
MAV 88 SVA RCA	8x8	S-Video & Audio (RCA)	60-555-32
MAV 88 SVA	8x8	S-Video & Audio	60-555-22
MAV 168 SVA	16x8	S-Video & Audio	60-364-01
MAV 1616 SVA	16x16	S-Video & Audio	60-365-01

MAV 1616 HDA
HDTV/Component Video & Stereo Audio

HDTV/Component Video & Stereo Audio Matrix Switchers

HDTV/Component Video Matrix Switchers			Part Number
MAV 168 HD	16x8	HDTV/Component Video	60-366-02
MAV 1616 HD	16x16	HDTV/Component Video	60-367-02

HDTV/Component Video & Stereo Audio Matrix Switchers			Part Number
MAV 168 HDA	16x8	HDTV/Component Video & Audio	60-366-01
MAV 1616 HDA	16x16	HDTV/Component Video & Audio	60-367-01

MAV 1616 A
Stereo Audio Only

Stereo Audio Matrix Switchers

Balanced or Unbalanced Stereo Audio Matrix Switchers			Part Number
MAV 168 A	16x8	Stereo Audio	60-329-03
MAV 1616 A	16x16	Stereo Audio	60-240-06
MAV 2412 A	24x12	Stereo Audio	60-474-03
MAV 2424 A	24x24	Stereo Audio	60-472-03
MAV 3216 A	32x16	Stereo Audio	60-475-03
MAV 3232 A	32x32	Stereo Audio	60-473-03

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MAV Series (continued)...

INCLUDED ACCESSORIES

Rack mount kit (MAV 44/48/84/88 only)

OPTIONAL ACCESSORIES

IPL T S2 .....60-544-01 (page 240)
1U Enclosure under-desk mount kit .....70-222-01 (page 443)
SVHSM-BNCF adapter.....26-353-01 (page 418)
BNCM-RCAF adapter.....10-264-01 (page 418)
CSR 6 adapter .....26-575-01 (page 418)
IR 501 (MAV 44/48/84/88 only) .....70-336-01 (page 427)

SPECIFICATIONS

VIDEO

- Routing
  - MAV 44 Series ..... 4 x 4 matrix
  - MAV 48 Series ..... 4 x 8 matrix
  - MAV 62 ..... 6 x 2 matrix
  - MAV 84 Series ..... 8 x 4 matrix
  - MAV 88 Series ..... 8 x 8 matrix
  - MAV 128 RCA ..... 12 x 8 matrix
  - MAV 168 Series ..... 16 x 8 matrix
  - MAV 1616 Series ..... 16 x 16 matrix
  - MAV 2412 Series ..... 24 x 12 matrix
  - MAV 2424 Series ..... 24 x 24 matrix
  - MAV 3216 Series ..... 32 x 16 matrix
  - MAV 3232 Series ..... 32 x 32 matrix
- Gain ..... Unity
- Bandwidth
  - MAV 44/48/84/88 Series ..... 200 MHz (-3dB), fully loaded
  - All other models ..... 150 MHz (-3dB), fully loaded
- Phase between I/Os ..... <1.28° at 3.58 MHz
- Differential phase error ..... <0.1% at 3.58 MHz and 4.43 MHz
- Differential gain error ..... <0.1° at 3.58 MHz and 4.43 MHz
- Max. propagation of delay..... 5 ns typical (±1 ns)
- Crosstalk ..... <-50dB @ 5 MHz
- Switching speed
  - MAV 44/48/84/88 Series ..... 20 ms (max.)
  - All other models ..... 200 ns (max.)

VIDEO INPUT

- Number/signal type
  - MAV 44/48/62/84/88 Series
    composite video models ..... 4, 6, or 8 composite video, depending on model
  - MAV 44/48/62/84/88 Series
    S-video models ..... 4, 6, or 8 S-video, depending on model
    MAV 168/1616 Series..... 16 RGsB, RsGsBs, component video (Y, R-Y, B-Y), HDTV, S-video, composite video
  - MAV 128 RCA, MAV 2412/2424 or
    MAV 3216/3232 models..... 12, 24, or 32 composite video, depending on model
- Connectors
  - MAV 44/48/62/84/88
    composite video models ..... 4, 6, or 8 female BNC
    MAV 44/48/62/84/88 S-video models ..... 4, 6, or 8 female 4-pin mini DIN
    MAV 48/84/128 RCA ..... 4, 8, or 12 RCA female
    MAV 168/1616 Series..... 16 x (1, 2, or 3) BNC female
    MAV 2412/2424 or MAV 3216/3232 models.. 24 or 32 BNC female
- Nominal level..... 1V p-p for Y of component video and S-video, and for composite video
  0.7V p-p for RGB
  0.3V p-p for R-Y and B-Y of component video, and for C of S-video
- Minimum/maximum levels
  - MAV 44/48/84/88 Series ..... Analog: 0.4V to 2.0V p-p with no offset
  - All other models ..... Analog: 0.5V to 2.0V p-p with no offset
- Impedance ..... 75 ohms
- Return loss
  - MAV 44/48/84/88 Series
    - Composite video:..... <-40dB @ 0 to 10 MHz
    - S-video: ..... <-25dB @ 0 to 10 MHz
  - All other models ..... <-30dB @ 5 MHz
- Maximum DC offset..... 1.5V
- External sync (genlock)
  - MAV 44/48/84/88 Series ..... 0.2V to 0.4V p-p
  - All other models ..... 0.3V to 0.4V p-p
- AC/DC coupling..... MAV 44/84/88 Series: DC coupling only

VIDEO OUTPUT

- Number/signal type
  - MAV 62/44/48/84/88/128
    composite video models ..... 2, 4, or 8 composite video
  - MAV 62/44/48/84/88/128
    S-video models ..... 2, 4, or 8 S-video
    MAV 168 Series ..... 8 RGsB, RsGsBs, component video (Y, R-Y, B-Y), HDTV, S-video, composite video
    MAV 1616 Series ..... 16 RGsB, RsGsBs, component video (Y, R-Y, B-Y), HDTV, S-video, composite video
  - MAV 2412/3216/2424/3232
    composite video models ..... 12, 16, 24, or 32 composite video
- Connectors
  - MAV 62/44/48/84/88
    composite video models..... 2, 4, or 8 BNC female
    MAV 62/44/48/84/88 S-video models ..... 2, 4, or 8 female 4-pin mini DIN
    MAV 84/48/128 RCA ..... 4 or 8 RCA female
    MAV 168/1616 Series..... (8 or 16) x (1, 2, or 3) BNC female
  - MAV 2412/3216/24243232
    composite video models ..... 12, 16, 24, or 32 BNC female
- Nominal level..... 1V p-p for Y of component video and S-video, and for composite video
  0.7V p-p for RGB
  0.3V p-p for R-Y and B-Y of component video, and for C of S-video
- Minimum/maximum levels
  - MAV 44/48/84/88 Series ..... 0.4V to 2.0V p-p
  - All other models ..... 0.5V to 2.0V p-p
- Impedance ..... 75 ohms
- Return loss
  - MAV 44/48/84/88 Series
    - S-video ..... <-25dB @ 5 MHz
    - Composite video ..... <-40dB @ 5 MHz
  - All other models ..... -30dB @ 5 MHz
- DC offset ..... ±5mV maximum with input at 0 offset
- Switching type ..... Vertical interval

SYNC

- Input/output type ..... RGsB, RsGsBs
- Genlock connectors (MAV 44/48/84/88 Series).. 2 BNC female
- Standards ..... NTSC 3.58, NTSC 4.43, PAL, SECAM
- Input impedance ..... 75 ohms
- Output impedance ..... 75 ohms
- Max. propagation delay..... 5 ns

AUDIO — AUDIO MODELS ONLY

- Routing
  - MAV 44 Series ..... 4 x 4 stereo matrix
  - MAV 48 Series ..... 4 x 8 stereo matrix
  - MAV 62 ..... 6 x 2 stereo matrix
  - MAV 84 Series ..... 8 x 4 stereo matrix
  - MAV 88 Series ..... 8 x 8 stereo matrix
  - MAV 128 RCA ..... 12 x 8 stereo matrix
  - MAV 168 audio ..... 16 x 8 stereo matrix
  - MAV 1616 audio ..... 16 x 16 stereo matrix
  - MAV 2412 Series ..... 24 x 12 stereo matrix
  - MAV 2424 Series ..... 24 x 24 stereo matrix
  - MAV 3216 Series ..... 32 x 16 stereo matrix
  - MAV 3232 Series ..... 32 x 32 stereo matrix
- Gain
  - MAV 44/48/84/88 Series ..... Adjustable; the default is unity
  - 6-, 8-, 12-, 16-input models ..... Unbalanced output: 0dB; balanced output: +6dB
  - 24- and 32-input models ..... Unbalanced output: -6dB; balanced output: 0dB
- Frequency response ..... 20 Hz to 20 kHz, ±0.05dB
- THD + Noise
  - MAV 44/48/84/88 Series ..... 0.03% @ 1 kHz, 0.3% @ 20 kHz at nominal level
  - All other models ..... 0.03% @ 1 kHz at nominal level
- S/N ..... >90dB, balanced, at maximum output
- Crosstalk
  - MAV 44/48/84/88 Series ..... <-65dB @ 20 kHz, <-80dB @ 1 kHz or below 60 Hz, fully loaded
  - All other models ..... <-80dB @ 1 kHz, fully loaded

CONTINUED ON NEXT PAGE...

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MAV Series (continued)...

Stereo channel separation
- MAV 44/48/84/88 Series ..... >80dB @ 20 Hz to 20 kHz
- All other models ..... >80dB @ 1 kHz

CMRR ..... >75dB @ 20 Hz to 20 kHz

AUDIO INPUT — AUDIO MODELS ONLY

Number/signal type
- MAV 44/48/62/84/88/168/1616/2412/2424/3216/3232 Series ..... 4, 6, 8, 16, 24, or 32 stereo, balanced/unbalanced
- MAV 44/48/84/88/128 RCA Series ..... 4, 8, or 12 stereo, unbalanced

Connectors
- MAV 44/48/62/84/88/168/1616/2412/2424/3216/3232 Series ..... (4, 6, 8, 16, 24, or 32) 3.5 mm captive screw connectors, 5 pole
- MAV 44/48/84/88/128 RCA Series ..... (4, 8, or 12) x 2 RCA female jacks

Impedance
- MAV 44/48/84/88 Series ..... >50 kohms unbalanced, 25 kohms balanced, DC coupled
- All other models ..... >10 kohms unbalanced/balanced, DC coupled

Nominal level
- MAV 44/48/84/88 Series ..... Configurable: +4dBu (1.23V, professional level) or -10dBV (316mV, consumer level)
- All other models ..... -10dBV (316mV)

Maximum level ..... +20dBu, (balanced or unbalanced) at 1%THD+N

Input gain adjustment
- MAV 44/48/84/88 Series ..... -18dB to +10dB, adjustable per input; input gain = [the internal audio level at -10dBV (316mV)] minus [input audio level]
- 6-, 8-, 12-, 16-input models ..... -15dB to +9dB, adjustable per input via RS-232/422 or front panel
- 24- and 36-input models ..... -18dB to +24dB, adjustable per input by RS-232/422 or front panel

NOTE: *0dBu = 0.775V, 0dBV = 1V, 0dBV ≈ 2dBu*

AUDIO OUTPUT — AUDIO MODELS ONLY

Number/signal type
- MAV 62/44/84/48/88/168/2412/1616/3216/2424/3232 Series ..... 2, 4, 8, 12, 16, 24, or 32 stereo, balanced/unbalanced
- MAV 44/84/48/88/128 RCA series ..... 4 or 8 stereo, unbalanced

Connectors
- MAV 62/44/84/48/88/168/2412/1616/3216/2424/3232 Series ..... (2, 4, 8, 12, 16, 24, or 32) 3.5 mm captive screw connectors, 5 pole
- MAV 44/84/48/88/128 RCA series ..... (4 or 8) x 2 RCA female jacks

Impedance
- MAV 84/128 RCA ..... 50 ohms unbalanced; capable of 600 ohms drive
- All other audio models ..... 50 ohms unbalanced, 100 ohms balanced

Gain error ..... <±0.1dB channel to channel

Nominal level (MAV 44/48/84/88 Series) ..... Configurable: +4dBu (1.23V, professional level) or -10dBV (316mV, consumer level)

Maximum level — MAV 44/48/84/88 Series
- Hi-Z ..... >+24dBu, balanced; >+18dBu, unbalanced at 1%THD+N
- 600 ohm ..... >+22dBm, balanced; >16dBm, unbalanced at 1%THD+N

Maximum level — All other models
- Hi-Z ..... >+21dBu, balanced or unbalanced at stated %THD+N
- 600 ohm ..... >+15dBm, balanced or unbalanced at stated %THD+N

NOTE: *0dBu = 0.775V, 0dBV = 1V.*

CONTROL/REMOTE — SWITCHER

Serial control port
- MAV 62, MAV 44/48/84/88 Series..... RS-232, 9-pin female D connector
- All other models ..... RS-232 or RS-422, 9-pin female D connector

IR remote control
(MAV 44/48/84/88 Series) ..... IR 501 remote control

Ethernet control port ..... 1 RJ-45 female connector

Ethernet data rate ..... 10/100Base-T, half/full duplex with autodetect

Ethernet protocol ..... ARP, ICMP (ping), TCP/IP, Telnet, HTTP, SMTP

Program control ..... Extron's control program for Windows®
Extron's Simple Instruction Set™ – SIS™
Microsoft Internet Explorer, Netscape Navigator, Telnet

GENERAL

Power ..... 100VAC to 240VAC, 50/60 Hz, internal, autoswitchable
- MAV 44/48/84/88 Series..... 15 watts
- MAV 168/1616 S-video/Component Video Series ..... 40 watts
- MAV 168/1616 Series (other than S-video or composite) ..... 65 watts
- MAV 2412/2424 Series..... 2 (primary and redundant) 100 watts
- MAV 3216/3232 Series..... 2 (primary and redundant) 120 watts
- All other models ..... 15 watts

Rack mount
- MAV 44/48/84/88 Series..... Yes, with included brackets, part #70-077-03. Also furniture mountable with an optional under-desk mounting kit, part #70-222-01.
- All other models ..... Yes (MAV 62 requires an optional 1U rack shelf, part #60-190-01)

Enclosure type ..... Metal

Enclosure dimensions
- MAV 62 ..... 1.75" H x 8.75" W x 9.5" D (1U high, half rack width)
4.4 cm H x 22.2 cm W x 24.1 cm D
- MAV 44/48/84/88 Series..... 1.75" H x 17.4" W x 8.5" D (1U high, full rack width)
4.4 cm H x 44.2 cm W x 21.6 cm D
(Depth excludes connectors. Width excludes rack ears.)
- MAV 84/128 RCA, MAV 168/1616 audio only, MAV 168/1616 composite ..... 3.5" H x 17.0" W x 9.4" D (2U high, full rack width)
8.9 cm H x 43.2 cm W x 23.9 cm D (Depth excludes connectors and controls. Width excludes rack ears.)
- MAV 168/1616 S-video..... 5.25" H x 17.0" W x 9.4" D (3U high, full rack width)
13.3 cm H x 43.2 cm W x 23.9 cm D (Depth excludes connectors and controls. Width excludes rack ears.)
- MAV 168/1616 component..... 7.0" H x 17.0" W x 9.7" D (4U high, full rack width)
17.8 cm H x 43.2 cm W x 24.6 cm D (Depth excludes connectors and controls. Width excludes rack ears.)
- MAV 2412/2424 Series, MAV 3216/3232 Series..... 8.75" H x 17.0" W x 12.25" D (5U high, full rack width)
22.2 cm H x 43.2 cm W x 31.1 cm D (Depth excludes connectors and controls. Width excludes rack ears.)

Shipping/product weight
- MAV 62 ..... 6 lbs (3 kg)/3.3 lbs (1.5 kg)
- MAV 44/48/84/88 Series..... 10 lbs (5 kg)/7.0 lbs (3.2 kg)
- MAV 84/128 RCA..... 15 lbs (7 kg)/8.9 lbs (4.0 kg)
  - DIM weight ..... 25 lbs
- MAV 168/1616 2U models ..... 15 lbs (7 kg)/9.4 lbs (4.3 kg)
  - DIM weight ..... 25 lbs
- MAV 168/1616 3U models ..... 18 lbs (9 kg)/11.9 lbs (5.4 kg)
  - DIM weight ..... 25 lbs
- MAV 168/1616 4U models ..... 22 lbs (10 kg)/14.4 lbs (6.5 kg)
  - DIM weight ..... 25 lbs
- MAV 2412/3216 Series ..... 24 lbs (11 kg)/19.4 lbs (8.8 kg)
  - DIM weight ..... 29 lbs
- MAV 2424/3232 Series..... 26 lbs (12 kg)/17.5 lbs (7.9 kg)
  - DIM weight ..... 31 lbs

Listings ..... UL, CUL

Compliances
- MAV 84/128 RCA..... CE, FCC Class A & B, VCCI, AS/NZS, ICES
- MAV 44/84/88 Series, MAV 2412/2424/3216/3232..... CE, FCC Class A, VCCI, AS/NZS, ICES
- All other models ..... CE

Warranty ..... 3 years parts and labor

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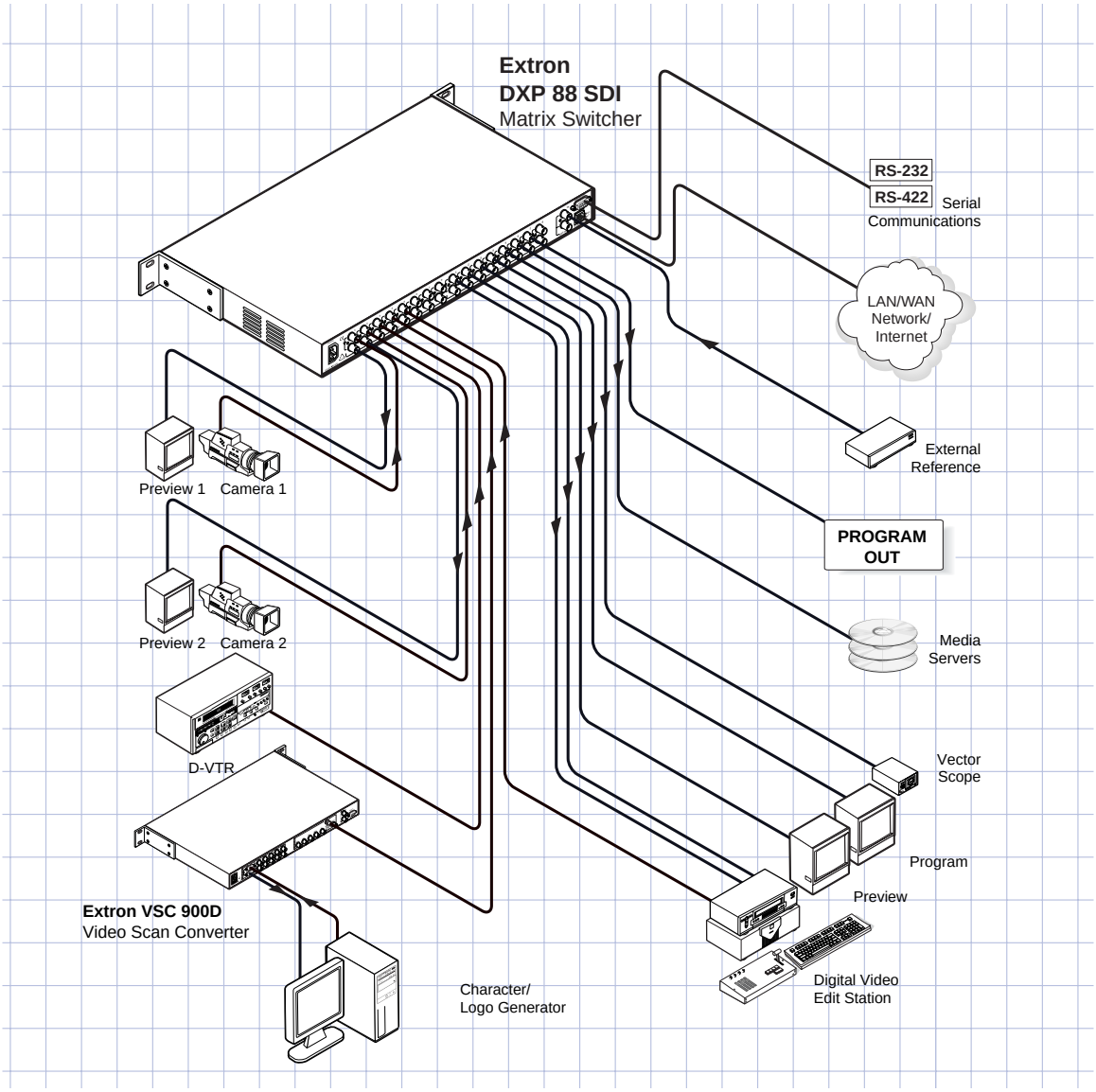
– Digital Video –



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Digital XPoint Series

DXP 44 SDI & DXP 88 SDI Serial Digital Video Matrix Switchers

SIS™ Simple Instruction Set

DXP 44 SDI

DXP 88 SDI

DESCRIPTION

Extron **Digital XPoint Series** are SDI digital video matrix switchers, ideal for switching multiple serial digital video signals to multiple digital video devices in video production studios, non-linear editing suites, staging events, and video broadcast studios.

There are two models available in the Digital XPoint line: a 4x4 model (**DXP 44 SDI**) and an 8x8 model (**DXP 88 SDI**). Each input has an equalized and buffered loop-through, and each output has dual buffered and re-clocked BNC outputs.

The Digital XPoint Series conforms to the SMPTE 259M specification. These digital matrix switchers handle all composite (143 and 177 Mbps), component 4:2:2 (270 Mbps), and wide-screen 16:9 (360 Mbps) serial standards. Automatic cable equalization typically equalizes greater than 300 meters at 270 Mbps of Extron SHR or equivalent high quality cable.

Extron Digital XPoint Series matrix switchers are housed in a rack-mountable, 1U high, 19 inch wide enclosure. Each switcher comes standard with a front panel control and is capable of communicating with the Extron MKP 1000 remote keypad and/or MCP 1000 Master Control Panel. Control of the Digital XPoint Series from a third party control system can be done via RS-232, RS-422, or Ethernet.

FEATURES

- **Inputs with equalized and buffered loop-throughs**
- **Outputs each with two buffered and equalized BNCs**
- **Serial Digital Data Rates from 143 Mbps to 360 Mbps–** Capable of switching 4fsc (composite) or 4:2:2 (component) serial digital video transmission standards.
- **SMPTE 259M compliant**
- **Automatic input cable equalization–** Typically equalizes greater than 300m at 270 Mbps of Extron SHR or equivalent high quality cable.
- **Automatic rate selection–** The Digital XPoint series can automatically accept four SMPTE data rates, including 143, 177, 270, and 360 Mbps. The auto mode is ideal for multi-rate serial data protocols where the matrix automatically detects and locks onto the incoming data signal.
- **Output data muting when input source is lost–** An internal muting function forces the serial data outputs to a static state when input data is not present or locked.
- **16 global presets–** These store commonly used switching configurations. Any preset may be recalled from the front panel or RS-232 control. When a preset is recalled, all the new I/O connections occur simultaneously (a salvo).
- **RS-232 and RS-422 control–** A rear panel, RS-232 and RS-422 port allows the Digital XPoint Series to be controlled via a third party system.
- **Simple Instruction Set (SIS™)–** Extron SIS is a set of basic ASCII code commands that provide simple control through a third-party control system. Instead of programming in long, obscure strings of code, SIS makes it easy to operate an Extron product using RS-232/422 control.
- **MCP 1000 and MKP 1000–** MCP 1000 or MKP 1000 control keypads offer the flexibility to control the Digital XPoint Series from a remote location. Both remote control options are easy to use and provide tactile buttons for quick selection. Each MCP 1000 or MKP 1000 panel may be used for one-button switching for a particular output or selecting global presets.
- **LCD display–** Displays current input/output configuration, preset configurations, and input carrier detect, as well as the status of additional system features.
- **Control software–** Extron has developed a Windows®-based control software that provides the ability to control every Extron matrix switcher. This program makes input/output configuration and other customization functions simple and convenient because it uses graphic icons.
- **IP Control (Ethernet)–** The Digital XPoint Series are capable of being controlled through an Ethernet local area network (LAN) and/or wide area network (WAN) using standard Internet Protocols (IP). This ability provides flexible connectivity for proactive monitoring, off-site control, maintenance, and product status.

MODEL	PART #
DXP 44 SDI	60-402-01
DXP 88 SDI	60-401-01

OPTIONAL ACCESSORIES

MCP 1000M .....60-298-01 (page 433)

SPECIFICATIONS

VIDEO

Routing	
DXP 44 SDI	4 x 4 matrix
DXP 88 SDI	8 x 8 matrix
Data rates	143 Mbps, 177 Mbps, 270 Mbps, 360 Mbps
Auto data rate lock	Yes
Standard	SMPTE 259M
Data types	8 bit or 10 bit

VIDEO INPUT

Number/signal type	
DXP 44 SDI	4 SDI serial digital video (8 or 10 bit SMPTE 259 M widescreen 16:9, component 4:2:2, and composite video) inputs, and 4 buffered loop-throughs
DXP 88 SDI	8 SDI serial digital video (8 or 10 bit SMPTE 259 M widescreen 16:9, component 4:2:2, and composite video), and 8 buffered loop-throughs
Connectors	
DXP 44 SDI	4 female BNC for input, 4 female BNC for loop-through
DXP 88 SDI	8 female BNC for input, 8 female BNC for loop-through
Input cable equalization	1 to 300 m for data rates up to 270 Mbps 1 to 200 m for data rates up to 360 Mbps
Auto equalization	Yes
Input return loss	>15dB, 5 MHz to 270 MHz
Recommended cable type	Extron SHR or equivalent
Impedance	75 ohm
External sync (genlock)	0.3V to 0.4V p-p

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Digital XPoint Series (continued)...

VIDEO OUTPUT

Number/signal type
- DXP 44 SDI ..... 4 dual SDI serial digital video (SMPTE 259 M widescreen 16:9, component 4:2:2, and composite video)
- DXP 88 SDI ..... 8 dual SDI serial digital video (SMPTE 259 M widescreen 16:9, component 4:2:2, and composite video)

Connectors
- DXP 44 SDI ..... 4 x 2 BNC female
- DXP 88 SDI ..... 8 x 2 BNC female

Number of outputs per channel ..... 2 outputs per channel
Nominal level ..... 0.8V ±10%
Impedance ..... 75 ohms
Return loss ..... >40dB @ 5 MHz
DC offset ..... ±500mV maximum with input at 0 offset
Jitter ..... <0.2 µs p-p
DC offset (termin. @ 75 ohms) ..... 0.5V (±)
Rise and fall time (20-80%) ..... 0.6 ns = 100 ps

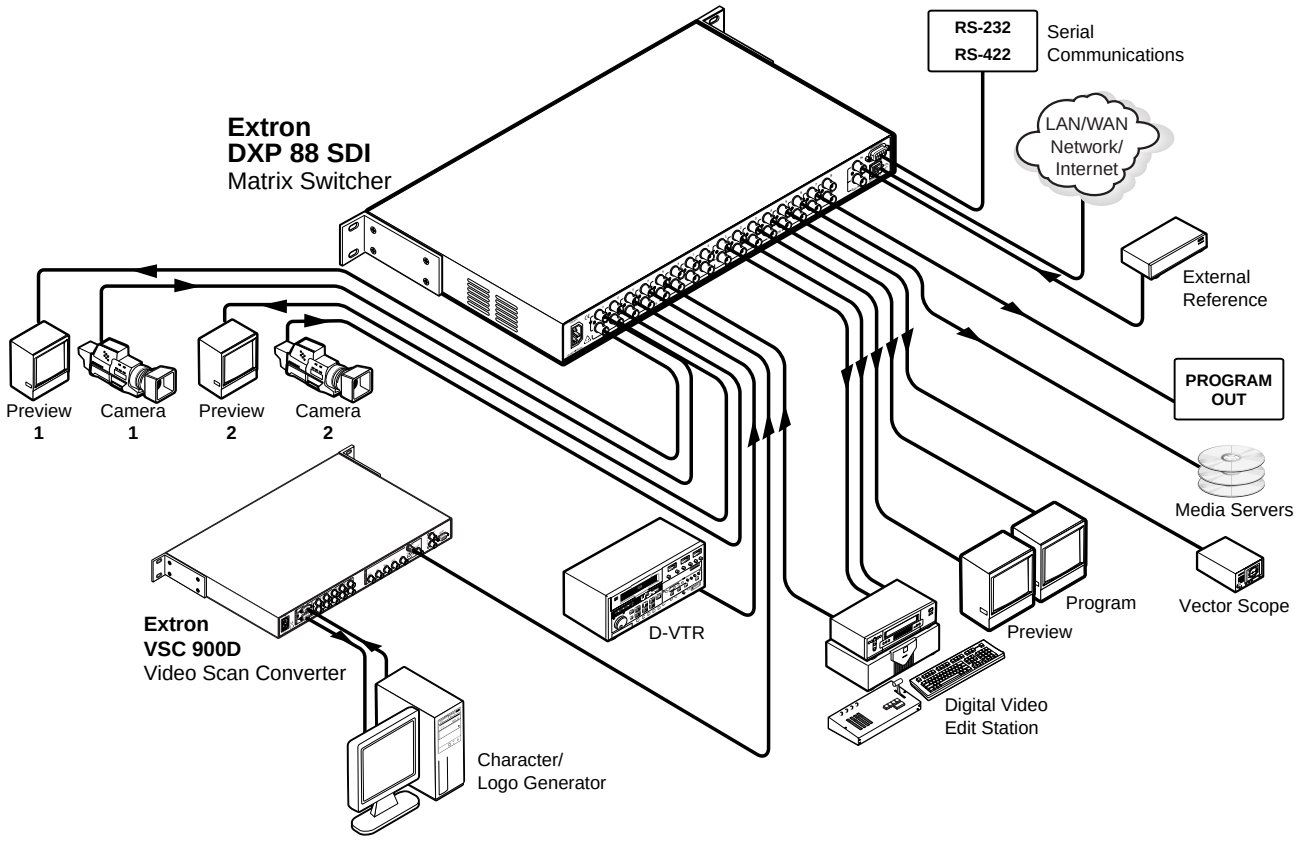
CONTROL/REMOTE — SWITCHER

Serial control port ..... RS-232 or RS-422, 9-pin female D connector
Ethernet control port ..... 1 RJ-45 female connector
Ethernet data rate ..... 10Base-T, half duplex with autodetect
Ethernet protocol ..... ARP, ICMP (ping), TCP/IP, Telnet
Program control ..... Extron's control program for Windows®
Extron's Simple Instruction Set™ (SIS™)
Microsoft Explorer, Netscape Navigator, Telnet

GENERAL

Power ..... 100VAC to 240VAC, 50/60 Hz, 40 watts, internal, autoswitchable
Rack mount ..... Yes, with included mounting brackets, 1U high. These can also be mounted under or through furniture with the provided brackets.
Enclosure type ..... Metal
Enclosure dimensions ..... 1.75" H x 17.5" W x 9.5" D (1U high, full rack width)
4.4 cm H x 44.4 cm W x 24.1 cm D
(Depth excludes connectors. Width excludes rack ears.)
Product weight ..... 4.9 lbs (2.2 kg)
Shipping weight ..... 8 lbs (3.6 kg)
Listings/Compliances ..... UL, CUL, CE, FCC Class A, AS/NZS, ICES
Warranty ..... 3 years parts and labor

APPLICATION



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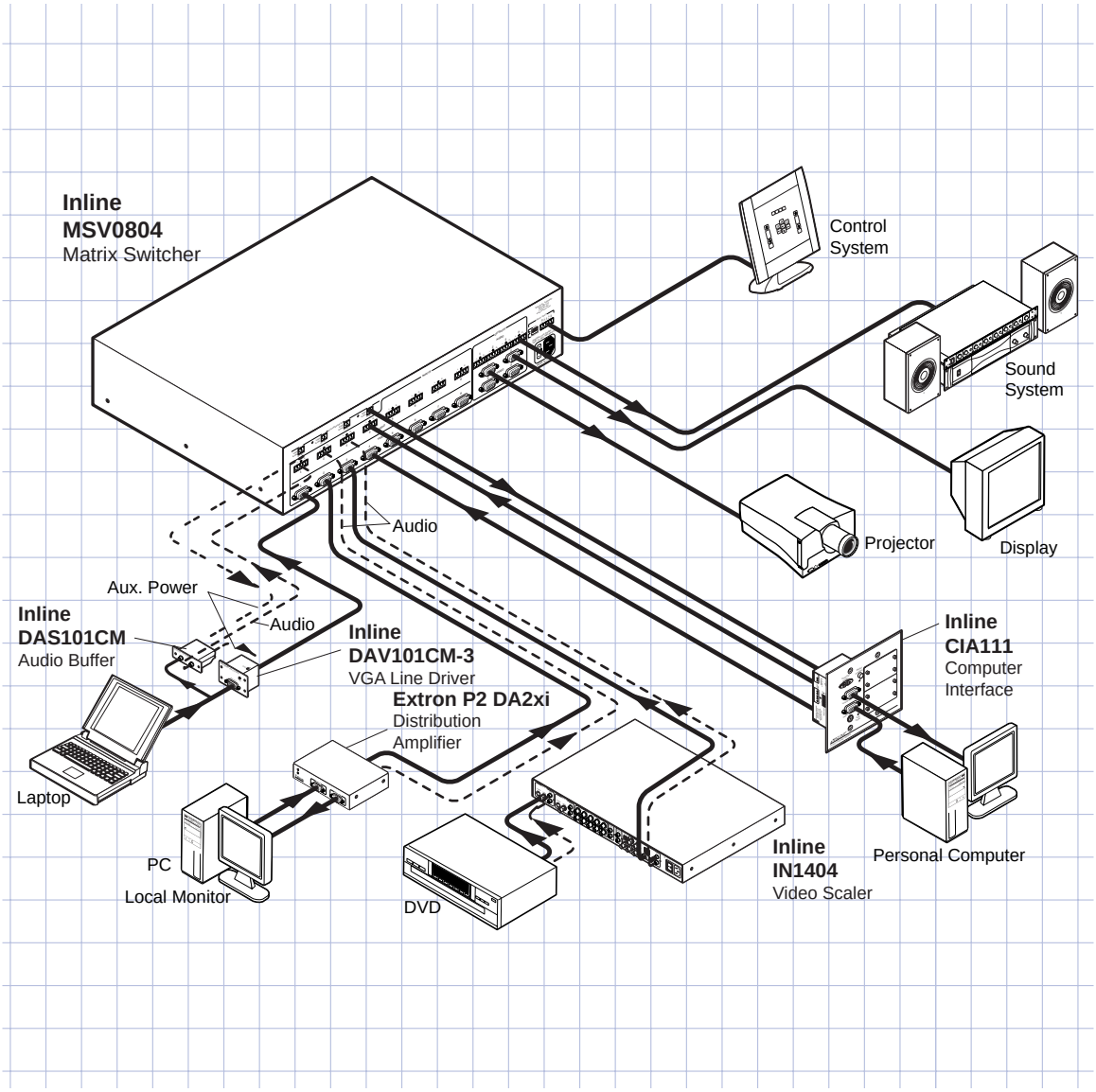
– VGA & Video –



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MSV0502

5x2 VGA and Stereo Audio Matrix Switcher

HDTV READY!

DESCRIPTION

The Inline **MSV0502** is a compact 5x2 VGA and Stereo Audio Matrix Switcher that is compatible with RGBHV, RGBS, RGsB, and component video signals. The MSV0502 offers video bandwidth of 450 MHz (-3dB), providing ample performance for high resolution video signals at nearly any resolution and refresh rate. Since the MSV0502 connects directly to pre-terminated VGA cables, the unit offers a quick, simple system solution for permanent installations, rental and staging systems, and more. For all input cable runs of 25 feet or more, the Inline DAV101CM VGA line driver is recommended to provide cable equalization and sync buffering.

The MSV0502-2, MSV0502-3 and MSV0502-4 all offer high quality signal routing for stereo audio signals. These matrix switchers are compatible with balanced or unbalanced line level audio signals. By wiring the inputs and outputs appropriately, unbalanced input signals can be output as balanced audio and vice versa. Unique gain trim levels can be adjusted and stored for each input, helping to standardize signal levels among various types of audio sources. Each output offers variable audio output level and mute capability that can be controlled locally using the front panel Volume and Mute buttons, remotely via serial commands, or using the optional Inline CTL120-2 IR remote control. Left/right balance can also be adjusted as required using serial commands.

Featuring 32 global presets, the MSV0502 can store frequently used configurations and then quickly recall them using just two button presses. Seven memory settings are available from the front panel and all 32 memories are available via serial commands. The memories store all input and output patches, as well as the current audio level for each output. The configuration memories make it easy to set up complex switching arrangements in advance, then recall them quickly and reliably during a show or presentation.

The ICS100 Inline Control Software included with the MSV0502 offers an intuitive graphical interface for effortless control of all matrix switcher functions using a PC.

FEATURES

- **450 MHz (-3dB) video bandwidth, fully loaded –** Ensures switching and distribution of most signals without degradation. The 450 MHz (-3dB) rating is a worst case specification; i.e., the MSV0502 models provide 450 MHz (-3dB) at full performance capacity— when one input signal drives both outputs.
- **Audio breakaway –** The MSV0502 matrix switchers provide the capability to break away an audio signal from its corresponding video signal. Audio breakaway switching can be done via front panel control or RS-232 control
- **Front panel –** Ergonomic design featuring soft-touch buttons and integrated labeling system.
- **32 global presets –** These store commonly used switching configurations. Presets may be recalled from the front panel or RS-232 control. When a preset is recalled, all the new I/O connections occur simultaneously.
- **Balanced and unbalanced audio –** Accepts both balanced and unbalanced stereo audio signals on captive screw connectors.
- **Individual audio input trim levels**
- **Audio output volume adjustment and muting –** Each individual output has volume control adjustment via the front panel or RS-232, RS422, and RS-485 control. Audio output levels can be set dynamically at different levels to feed the audio amplifier, thus eliminating the need for a pre-amplifier.
- **Blank button –** Allows the video and audio input sources to be disconnected from the output. Blank only affects the currently selected output (the other output remains unchanged).
- **Power outputs (MSV0502-3 only) –** Four 12VDC auxiliary power outputs provide up to four amps total current to power interfaces, line drivers or other equipment
- **RS-232, RS-422, and RS-485 control –** A rear panel RS-232, RS-422, and RS485 control port provides connection of the MSV0502 to a third party control system.
- **ICS100 control software –** Offers an intuitive graphical interface for effortless control of all matrix switcher functions using a PC.
- **IR Remote Control –** Input/output selection, volume and mute can be controlled remotely via infrared commands using the optional CTL120-2 infrared remote control or a third-party control system with infrared emitters.
- **Rack-mountable –** The MSV0502 matrix switchers are rack-mountable in any conventional 19-inch rack using the included rack ears.

MODEL / PART

MODEL	PART #
MSV0502 5x2 Matrix Switcher	
VGA Only	**MSV0502-1**
VGA + Stereo Audio	**MSV0502-2**
VGA + Stereo Audio + Aux DC Power	**MSV0502-3**
Stereo Audio Only	**MSV0502-4**

OPTIONAL ACCESSORIES

IPL T S2 .....60-544-01 (page 240)
IR remote control.....CTL120-2 (page 429)
CSR 6 adapter .....26-575-01 (page 418)

SPECIFICATIONS

VIDEO

Routing	5 x 2 matrix
Gain	Unity
Bandwidth	450 MHz (-3dB), fully loaded
0 MHz to 10 MHz	no more than +0.1dB to -0.1dB
0 MHz to 130 MHz	no more than +4.5dB to -0.5dB
Crosstalk	-80dB @ 10 MHz
Switching speed	400 ns (max.)

VIDEO INPUT

Number/signal type	5 RGBHV, RGBS, RGsB, RsGsBs, component video (Y, R-Y, B-Y)
Connectors	5 female 15-pin HD
Nominal level	1V p-p for Y of component video 0.7V p-p for RGB 0.3V p-p for R-Y and B-Y of component video
Minimum/maximum levels	Analog: 0.6V to 1.8V p-p including offset
Impedance	75 ohms
Return loss	<-40dB @ 5 MHz
Maximum DC offset	±0.5VDC

VIDEO OUTPUT

Number/signal type	2 RGBHV, RGBS, RGsB, RsGsBs, component video (Y, R-Y, B-Y)
Connectors	2 female 15-pin HD
Nominal level	1V p-p for Y of component video 0.7V p-p for RGB 0.3V p-p for R-Y and B-Y of component video
Minimum/maximum levels	0.6V to 1.8V p-p
Impedance	75 ohms
Return loss	<-45dB @ 5 MHz
DC offset	±8.5mV maximum with input at 0 offset

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MSV0502 (continued)...

SYNC

Input type	RGBHV, RGBS, RGsB, RsGsBs
Output type	RGBHV, RGBS, RGsB, RsGsBs
Input level	2.0V to 5.5V p-p
Output level	4.0V to 5.5V p-p, unterminated
Input impedance	510 ohms
Output impedance	75 ohms
Max. input voltage	5.0V p-p
Max. propagation delay	600 ns
Max. rise/fall time	600 ns
Polarity	Positive or negative (follows input)

AUDIO

Routing	5 x 2 stereo matrix
Gain	Unbalanced output: 0dB; balanced output: +6dB
Frequency response	20 Hz to 20 kHz, ±0.05dB; 10 Hz to 175 kHz, -3dB
THD + Noise	0.02% @ 1 kHz at nominal level
S/N	>74dB at maximum output
Crosstalk	<-70dB @ 1 kHz, fully loaded
Stereo channel separation	>76dB @ 1 kHz
CMRR	>81dB @ 20 Hz to 20 kHz

AUDIO INPUT

Number/signal type	5 stereo, balanced/unbalanced
Connectors	(5) 3.5 mm captive screw connectors, 5 pole
Impedance	>20 kohms unbalanced, 1 kohm balanced, DC coupled
Nominal level	-10dBV (316mV)
Maximum level	+16dBu, (balanced or unbalanced) at 1%THD+N
Input gain adjustment	-55dB to 0dB, adjustable per input

AUDIO OUTPUT

Number/signal type	2 stereo, balanced/unbalanced
Connectors	(2) 3.5 mm captive screw connectors, 5 pole
Impedance	50 ohms unbalanced, 100 ohms balanced
Gain error	±0.1dB channel to channel
Maximum level (Hi-Z)	>+22dBu, balanced or unbalanced at 1%THD+N
Maximum level (600 ohm)	>+16dBm, balanced or unbalanced at 1%THD+N

NOTE: *0dBu = 0.775 volts (RMS).*

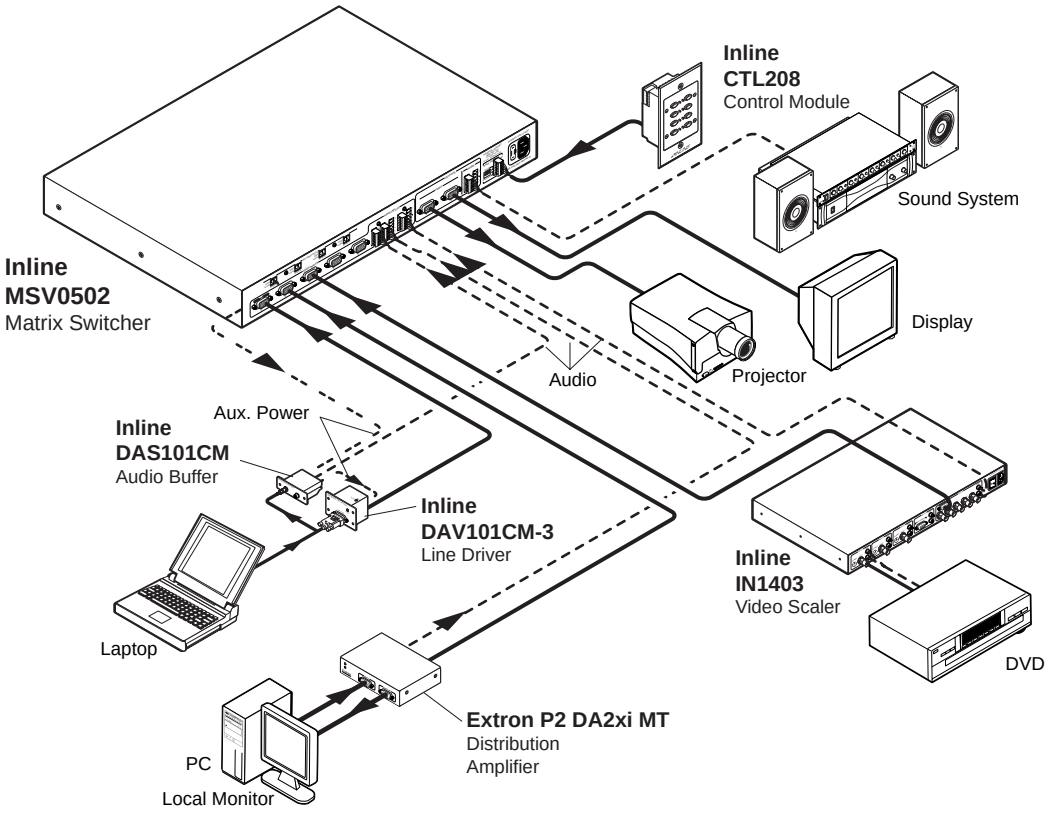
CONTROL/REMOTE — SWITCHER

Serial control port	RS-232, RS-422, or RS 485; 3.5 mm 5-pole captive screw connector
IR remote control	CTL120-2
Program control	ICS100 (Inline Control Software)

GENERAL

Power	100VAC to 240VAC, 50/60 Hz, 19 watts, internal, autoswitchable
Rack mount	Yes, with included brackets, part #MTR102-1
Enclosure type	Metal
Enclosure dimensions	1.8" H x 17.0" W x 11.4" D (1U high, full rack width) 4.6 cm H x 43.2 cm W x 29.0 cm D (Depth excludes connectors. Width excludes rack ears.)
Product weight	5.6 lbs (2.5 kg)
Shipping weight	10 lbs (5 kg)
Listings/Compliances	ETL (UL1950), CE
Warranty	3 years parts and labor

APPLICATION



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MSV0804

8x4 VGA and Stereo Audio Matrix Switcher

HDTV READY!

DESCRIPTION

The Inline **MSV0804** is an 8x4 VGA and Stereo Audio Matrix Switcher that is compatible with RGBHV, RGBS, RGsB, and component video signals. The MSV0804 offers video bandwidth of 450 MHz (-3dB), providing ample performance for high resolution video signals at nearly any resolution and refresh rate. Since the MSV0804 connects directly to pre-terminated VGA cables, the unit offers a quick, simple system solution for permanent installations, rental and staging systems, and more. For all input cable runs of 25 feet or more, the Inline DAV101CM VGA line driver is recommended to provide cable equalization and sync buffering.

The MSV0804-2, MSV0804-3 and MSV0804-4 all offer high quality signal routing for stereo audio signals. These matrix switchers are compatible with balanced or unbalanced line level audio signals. By wiring the inputs and outputs appropriately, unbalanced input signals can be output as balanced audio and vice versa. Unique gain trim levels can be adjusted and stored for each input, helping to standardize signal levels among various types of audio sources. Each output offers variable audio output level and mute capability that can be controlled locally using the front panel Volume and Mute buttons, remotely via serial commands, or using the optional Inline CTL120-2 IR remote control. Left/right balance can also be adjusted as required using serial commands.

Featuring 32 global presets, the MSV0804 can store frequently used configurations and then quickly recall them using just two button presses. Twelve memory settings are available from the front panel, and all 32 memories are available via serial commands. The memories store all input/output patches as well as the current audio level for each output. The configuration memories make it easy to set up complex switching arrangements in advance, then recall them quickly and reliably during a show or presentation.

The ICS100 Inline Control Software included with the MSV0804 offers an intuitive graphical interface for effortless control of all matrix switcher functions using a PC.

FEATURES

- **450 MHz (-3dB) video bandwidth, fully loaded –** Ensures switching and distribution of most signals without degradation. The 450 MHz (-3dB) rating is a worst case specification, i.e., the MSV0804 models provide 450 MHz (-3dB) at full performance capacity— when one input signal drives all outputs.
- **Audio breakaway –** The MSV0804 matrix switchers provide the capability to break away an audio signal from its corresponding video signal. Audio breakaway switching can be done via front panel control or RS-232 control.
- **Front panel –** Ergonomic design featuring soft-touch buttons and integrated labeling system.
- **32 global presets –** These store commonly used switching configurations. Presets may be recalled from the front panel or RS-232 control. When a preset is recalled, all the new I/O connections occur simultaneously.
- **Balanced and unbalanced audio–** Accepts both balanced and unbalanced stereo audio signals on captive screw connectors.
- **Individual audio input trim levels**
- **Audio output volume adjustment and muting –** Each individual output has volume control adjustment via the front panel or RS-232, RS422, and RS-485 control. Audio output levels can be set dynamically at different levels to feed the audio amplifier, thus eliminating the need for a pre-amplifier.
- **Blank button –** Allows the video and audio input sources to be disconnected from the output. Blank only affects the currently selected output (the other outputs remain unchanged).
- **Power outputs (MSV0804-3 only) –** Four 12VDC auxiliary power outputs provide up to four amps total current to power interfaces, line drivers or other equipment.
- **RS-232, RS-422, and RS-485 control –** A rear panel, RS-232, RS-422, and RS485 control port provides connection of the MSV0804 to a third party control system.
- **ICS100 control software –** Offers an intuitive graphical interface for effortless control of all matrix switcher functions using a PC.
- **IR Remote Control –** Input/output selection, volume and mute can be controlled remotely via infrared commands using the optional CTL120-2 infrared remote control or a third-party control system with infrared emitters.
- **Rack-mountable –** The MSV0804 matrix switchers are rack-mountable in any 2U rack space using included rack ears.

MODEL / PART

MODEL	PART #
MSV0804 8x4 Matrix Switcher	
VGA Only	**MSV0804-1**
VGA + Stereo Audio	**MSV0804-2**
VGA + Stereo Audio + Aux DC Power	**MSV0804-3**
Stereo Audio Only	**MSV0804-4**

OPTIONAL ACCESSORIES

IPL T S2 .....60-544-01 (page 240)
IR remote control.....CTL120-2 (page 429)
CSR 6 adapter .....26-575-01 (page 418)

SPECIFICATIONS

VIDEO

Routing	8 x 4 matrix
Gain	Unity
Bandwidth	450 MHz (-3dB), fully loaded
0 MHz to 10 MHz	no more than +0.1dB to -0.1dB
0 MHz to 130 MHz	no more than +4.5dB to -0.5dB
Crosstalk	-80dB @ 10 MHz
Switching speed	400 ns (max.)

VIDEO INPUT

Number/signal type	8 RGBHV, RGBS, RGsB, RsGsBs, component video (Y, R-Y, B-Y)
Connectors	8 female 15-pin HD
Nominal level	1V p-p for Y of component video 0.7V p-p for RGB 0.3V p-p for R-Y and B-Y of component video
Minimum/maximum levels	Analog: 0.6V to 1.8V p-p including offset
Impedance	75 ohms
Return loss	<-40dB @ 5 MHz
Maximum DC offset	±0.5VDC

VIDEO OUTPUT

Number/signal type	4 RGBHV, RGBS, RGsB, RsGsBs, component video (Y, R-Y, B-Y)
Connectors	4 female 15-pin HD

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MSV0804 (continued)...

Nominal level ..... 1V p-p for Y of component video
0.7V p-p for RGB
0.3V p-p for R-Y and B-Y of component video
Minimum/maximum levels ..... 0.6V to 1.8V p-p
Impedance ..... 75 ohms
Return loss ..... <-45dB @ 5 MHz
DC offset ..... ±8.5mV maximum with input at 0 offset

SYNC

Input type ..... RGBHV, RGBS, RGsB, RsGsBs
Output type ..... RGBHV, RGBS, RGsB, RsGsBs
Input level ..... 2.0V to 5.5V p-p
Output level ..... 4.0V to 5.5V p-p, unterminated
Input impedance ..... 510 ohms
Output impedance ..... 75 ohms
Max. input voltage ..... 5.0V p-p
Max. propagation delay ..... 600 ns
Max. rise/fall time ..... 600 ns
Polarity ..... Positive or negative (follows input)

AUDIO

Routing ..... 8 x 4 stereo matrix
Gain ..... Unbalanced output: 0dB; balanced output: +6dB
Frequency response ..... 20 Hz to 20 kHz, ±0.05dB; 10 Hz to 175 kHz, -3dB
THD + Noise ..... 0.02% @ 1 kHz at nominal level
S/N ..... >74dB at maximum output
Crosstalk ..... <-70dB @ 1 kHz, fully loaded
Stereo channel separation ..... >76dB @ 1 kHz
CMRR ..... >81dB @ 20 Hz to 20 kHz

AUDIO INPUT

Number/signal type ..... 8 stereo, balanced/unbalanced
Connectors ..... (8) 3.5 mm captive screw connectors, 5 pole
Impedance ..... >20 kohms unbalanced, 1 kohm balanced, DC coupled
Nominal level ..... -10dBV (316mV)
Maximum level ..... +16dBu, (balanced or unbalanced) at 1%THD+N
Input gain adjustment ..... -55dB to 0dB, adjustable per input

AUDIO OUTPUT

Number/signal type ..... 4 stereo, balanced/unbalanced
Connectors ..... (4) 3.5 mm captive screw connectors, 5 pole
Impedance ..... 50 ohms unbalanced, 100 ohms balanced
Gain error ..... ±0.1dB channel to channel
Maximum level (Hi-Z) ..... >+22dBu, balanced or unbalanced at 1%THD+N
Maximum level (600 ohm) ..... >+16dBm, balanced or unbalanced at 1%THD+N
NOTE: *0dBu = 0.775 volts (RMS).*

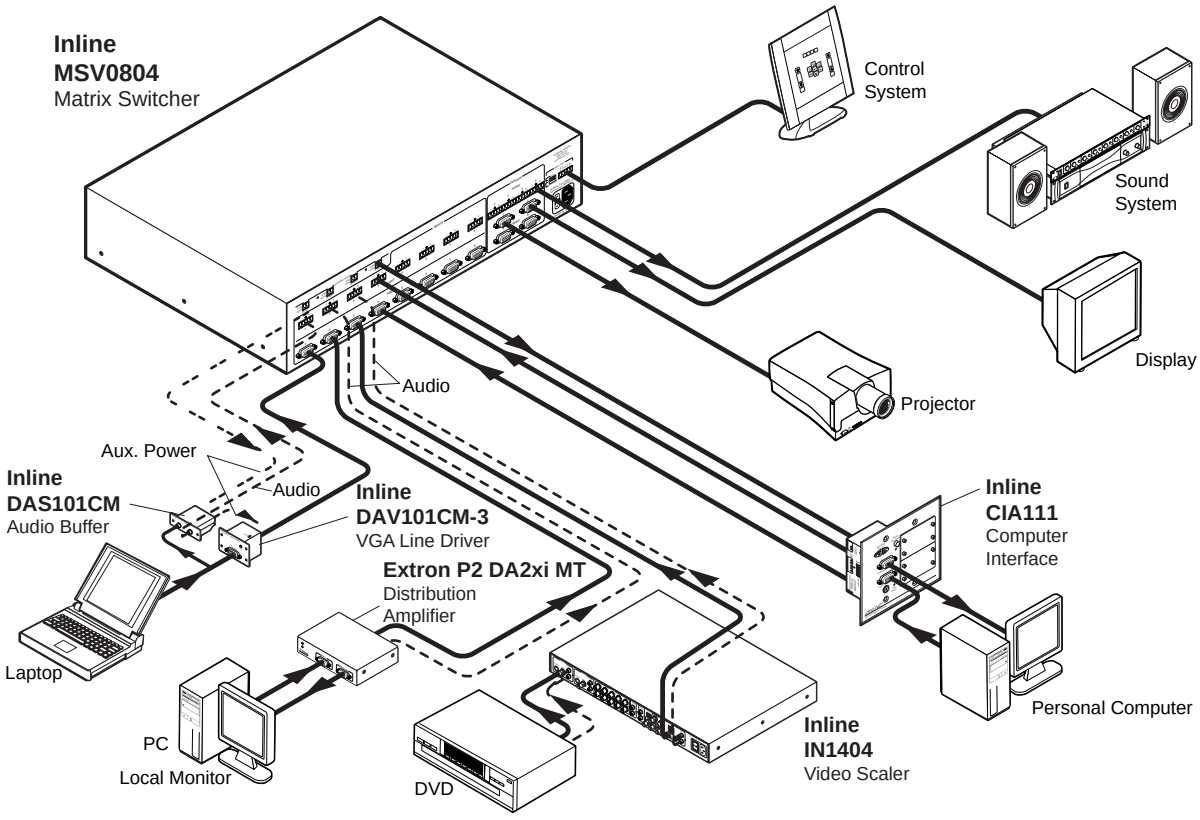
CONTROL/REMOTE — SWITCHER

Serial control port ..... RS-232, RS-422, or RS 485; 3.5 mm 5-pole captive screw connector
IR remote control CTL120-2
Program control ..... ICS100 (Inline Control Software)

GENERAL

Power ..... 100VAC to 240VAC, 50/60 Hz, 19 watts, internal, autoswitchable
Rack mount ..... Yes, with included brackets, part #MTR102-1
Enclosure type ..... Metal
Enclosure dimensions ..... 3.5" H x 17.0" W x 11.4" D (2U high, full rack width)
8.9 cm H x 43.2 cm W x 29.0 cm D
(Depth excludes connectors. Width excludes rack ears.)
Product weight ..... 6.9 lbs (3.1 kg)
Shipping weight ..... 12 lbs (6 kg)
DIM weight
USA/Canada ..... 25 lbs (12 kg)
International ..... 30 lbs (14 kg)
Listings/Compliances ..... ETL (UL1950), CE
Warranty ..... 3 years parts and labor

APPLICATION



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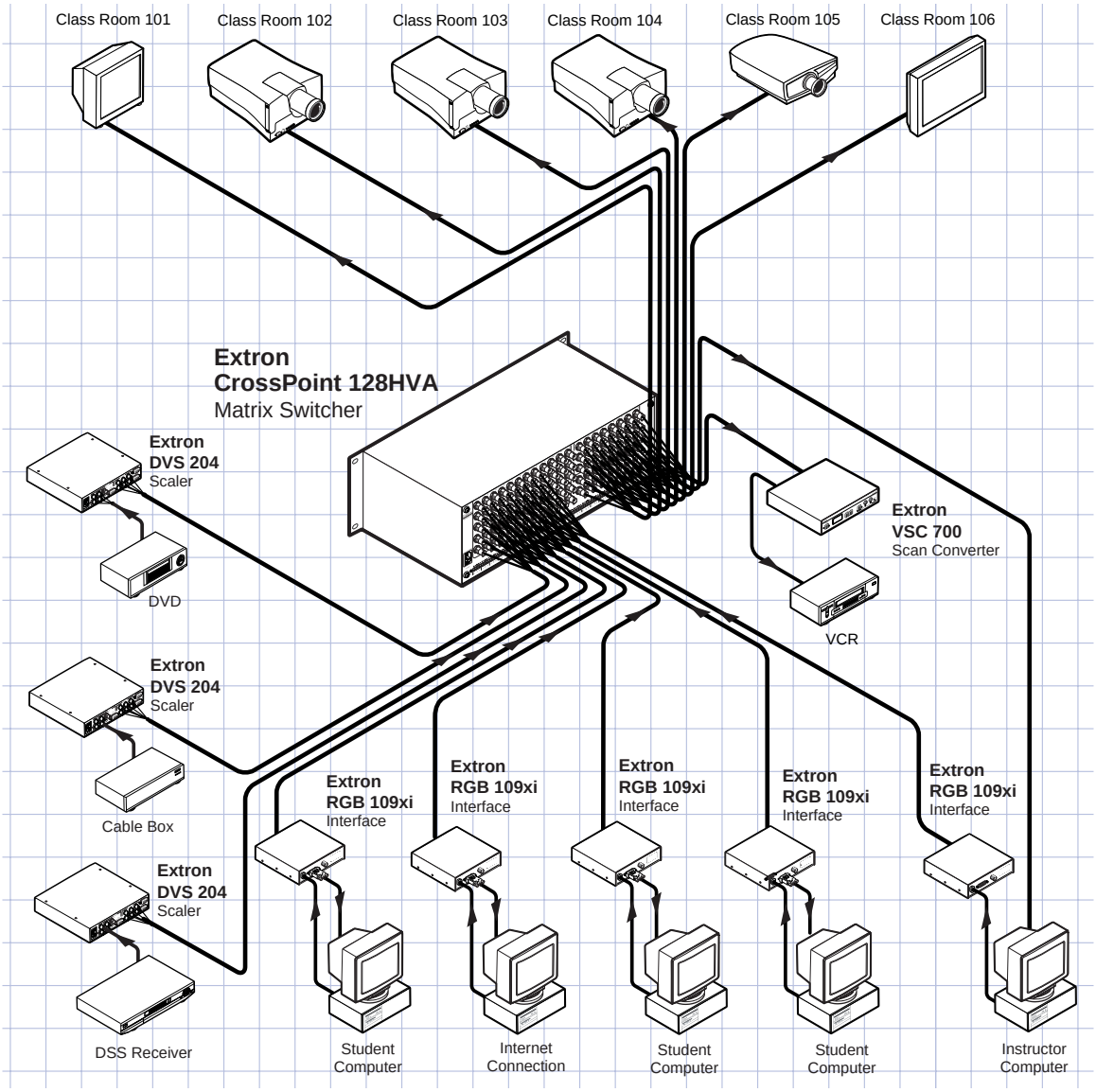
– *Wideband RGB and Video* –



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CrossPoint Series

Wideband Matrix Switchers for RGBS, RGBHV and/or Stereo Audio

HDTV READY!

SIS™ Simple Instruction Set

DESCRIPTION

Extron **CrossPoint Series** are analog RGBHV matrix switchers. Each model offers two versions: "HV" versions for switching RGBHV signals and "HVA" versions for switching RGBHV signals and two channel stereo audio (balanced and unbalanced). All models also switch RGBS, RGsB, HDTV, component video, S-video, and composite video.

The CrossPoint Series provides a single box solution to many routing applications. Each input and output is individually isolated and buffered, and any input(s) can be switched to any one or all outputs with virtually no crosstalk or signal noise between channels. Extron designed the CrossPoint Series to deliver optimum performance and value to the professional A/V market.

FEATURES

- **RGBHV–** All CrossPoint HV models switch separate horizontal and vertical sync to ensure proper sync polarity, providing a more stable image. All models switch RGBS, RGsB, HDTV, component video, S-video, and composite video.
- **200 MHz (-3dB) RGB video bandwidth, fully loaded–** Ensures switching and distribution of most signals without degradation. The 200 MHz (-3dB) rating is a worst case specification, i.e., the CrossPoint Matrix Switcher provides 200 MHz (-3dB) at full performance capacity— when one input signal drives all outputs.
- **300 MHz (-3dB) RGB video bandwidth, fully loaded (CrossPoint 42 only)–** Ensures switching and distribution of most signals without degradation. The 300 MHz (-3dB) rating is a worst case specification, i.e., the CrossPoint 42 provides 300 MHz (-3dB) at full performance capacity— when one input signal drives all outputs.
- **QuickSwitch Front Panel Controller (QS-FPC)–** The QuickSwitch FPC feature allows for touch-of-a-button input and output selection. Extron QuickSwitch technology eliminates the learning curve usually associated with switching the inputs and outputs of a matrix switcher by using a tactile front panel button for every input and output.
- **Front panel I/O label windows–** I/O buttons may be labeled by any Brother P-Touch labeler or Extron label software, which ships with every Extron matrix switcher. Each input and output can be labeled with names, alphanumeric characters, or even color bitmaps for easy and intuitive input and output selection.
- **View I/O mode–** Allows user to easily see which individual inputs and outputs are actively connected. Available from the front panel or RS-232 and RS-422 control.
- **Global presets–** Individual I/O configurations may be saved and recalled either from the QuickSwitch Front Panel Controller or RS-232 and RS-422. This time-saving feature allows you to set up I/O configurations and store them in memory for future use.
- **RS-232 and RS-422 control–** The CrossPoint Plus Series switchers offer RS-232 and RS-422 control, allowing the switcher to be controlled via a third party control system. Extron's SIS™—used for RS-232 and RS-422 control—is easy to learn, and use, and allows users to generate characters directly from a keyboard.
- **Simple Instruction Set (SIS™)–** Extron SIS is a set of basic ASCII code commands that provide simple control through a third party control system. Instead of programming in long, obscure strings of code, SIS makes it easy to operate an Extron product using RS-232 and RS-422 control.
- **Control software–** For RS-232 and RS-422 remote control from a PC, Extron ships our Windows®-based control software with every matrix switcher. This icon-driven software uses a graphical, drag-and-drop interface to make I/O configuration and other customization functions simple and convenient. This software also offers an emulation mode for configuration of an offsite matrix switcher; the I/O configuration may then be saved for future downloading to the matrix switcher.
- **MCP 1000 and MKP 1000 control–** Utilizing the MCP 1000 Master Control Panel and any combination of MCP 1000 slave control panels or MKP 1000 control keypads offers the flexibility to control a CrossPoint Matrix Switcher from a remote location. Both remote control options are easy to use and provide tactile buttons for quick selection. Each MCP 1000 panel may be used for one-button switching for a particular output and selecting global presets. Each MKP 1000 keypad may be used to select a different input or select a preset.
- **Input audio gain and attenuation (adjustable via RS-232 and RS-422 or front panel)–** The Extron CrossPoint Series allows users to set the level of audio gain or attenuation (-15dB to +9dB). Individual input audio levels may be adjusted so there are no noticeable volume differences between sources.

MKP 1000 & MCP 1000

- **Audio breakaway–** The CrossPoint Series "HVA" models provide the capability to break away an audio signal from its corresponding video signal. Audio breakaway switching can be done via front panel control or RS-232 and RS-422 control.
- **Rack-mountable–** The Extron CrossPoint Series of matrix switchers are mountable in any conventional 19-inch wide rack.
- **Internal international power supply–** The 100-240 volt, autoswitchable, internal power supply of the CrossPoint Series provides worldwide power compatibility.

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CrossPoint Series (continued)...

CrossPoint 42HVA

4x2 Wideband Matrix Switcher

Model	Part Number
CrossPoint 42HVA	60-504-01

CrossPoint 84HVA

8x4 Wideband Matrix Switchers

Model	Part Number
CrossPoint 84HV	60-219-05
CrossPoint 84HVA	60-219-06

CrossPoint 88HVA

8x8 Wideband Matrix Switchers

Model	Part Number
CrossPoint 88HV	60-325-05
CrossPoint 88HVA	60-325-06

CrossPoint 124HVA

12x4 Wideband Matrix Switchers

Model	Part Number
CrossPoint 124HV	60-326-05
CrossPoint 124HVA	60-326-06

CrossPoint 128HVA

12x8 Wideband Matrix Switchers

Model	Part Number
CrossPoint 128HV	60-220-05
CrossPoint 128HVA	60-220-06

16x8 Wideband Matrix Switchers

Model	Part Number
CrossPoint 168HV	60-330-05
CrossPoint 168HVA	60-330-06

CrossPoint 1616HVA

16x16 Wideband Matrix Switchers

Model	Part Number
CrossPoint 1616HV	60-242-05
CrossPoint 1616HVA	60-242-06

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CrossPoint Series (continued)...

SPECIFICATIONS

VIDEO

- Routing
  - 42 Series: 4 x 2 matrix
  - 84 Series: 8 x 4 matrix
  - 88 Series: 8 x 8 matrix
  - 124 Series: 12 x 4 matrix
  - 128 Series: 12 x 8 matrix
  - 168 Series: 16 x 8 matrix
  - 1616 Series: 16 x 16 matrix
- Gain: Unity
- Bandwidth
  - 42 Series: 300 MHz (-3dB), fully loaded
    - 0 - 10 MHz: no more than +0.1dB to -0.1dB
    - 0 - 130 MHz: no more than +4dB to -0.1dB
  - All other models: 200 MHz (-3dB), fully loaded
    - 0 - 10 MHz: no more than +0.1dB to -0.1dB
    - 0 - 130 MHz: no more than +6dB to -0.8dB
- Crosstalk
  - 42 Series: -55dB @ 10 MHz, -45dB @ 30 MHz, -30dB @ 100 MHz
  - All other models: -50dB @ 5 MHz, -45dB @ 10 MHz
- Switching speed: 200 ns (max.)

VIDEO INPUT

- Number/signal type: 4, 8, 12, or 16 RGBHV, RGBS, RGsB, RsGsBs, HDTV, component video, S-video, composite video
- Connectors
  - 42 Series: 4 x 5 BNC female
  - 84/88 Series: 8 x 5 BNC female
  - 124/128 Series: 12 x 5 BNC female
  - 168/1616 Series: 16 x 5 BNC female
- Nominal level: 1V p-p for Y of component video and S-video, and for composite video
0.7V p-p for RGB
0.3V p-p for R-Y and B-Y of component video, and for C of S-video
- Minimum/maximum levels: Analog: 0.5V to 2.0V p-p
- Impedance: 75 ohms
- Return loss: -30dB @ 5 MHz
- Maximum DC offset: 1.5V

VIDEO OUTPUT

- Number/signal type: 2, 4, 8, or 16 RGBHV, RGBS, RGsB, RsGsBs, HDTV, component video, S-video, composite video
- Connectors
  - 42 Series: 2 x 5 BNC female
  - 84/124 Series: 4 x 5 BNC female
  - 88/128 Series: 8 x 5 BNC female
  - 168 Series: 8 x 5 BNC female
  - 1616 Series: 16 x 5 BNC female
- Nominal level: 1V p-p for Y of component video and S-video, and for composite video
0.7V p-p for RGB
0.3V p-p for R-Y and B-Y of component video, and for C of S-video
- Minimum/maximum level: 2V p-p
- Impedance: 75 ohms
- Return loss: -30dB @ 5 MHz
- DC offset: ±5mV maximum with input at 0 offset
- Switching type (42 Series): Triple-Action

SYNC

- Input/output type: RGBHV, RGBS, RGsB, RsGsBs
- Input level: 0.5V to 5.0V p-p, 4.0V p-p normal
- Output level: AGC to TTL: 4V to 5V p-p, unterminated
- Input impedance
  - 42 Series: 75 or 510 ohms, switchable
  - 84/88/124/128 Series: 510 ohms
  - 168/1616 Series
    - Inputs 1, 3, 5, 7: 75 or 510 ohms, switchable
    - Inputs 2, 4, 6, 8, and 9 through 16: 510 ohms
- Output impedance: 75 ohms
- Polarity: Positive or negative (follows input)

AUDIO — AUDIO MODELS ONLY

- Routing
  - 42 Series: 4 x 2 stereo matrix
  - 84 Series: 8 x 4 stereo matrix
  - 88 Series: 8 x 8 stereo matrix
  - 124 Series: 12 x 4 stereo matrix
  - 128 Series: 12 x 8 stereo matrix
  - 168 Series: 16 x 8 stereo matrix
  - 1616 Series: 16 x 16 stereo matrix
- Gain
  - 42 Series: Unbalanced output: -6dB; balanced output: 0dB
Unbalanced output: 0dB; balanced output: +6dB
- Frequency response: 20 Hz to 20 kHz, ±0.05dB
- THD + Noise: 0.03% @ 1 kHz at nominal level
- S/N: >90dB, balanced, at rated maximum output (21dBu)
- Crosstalk: <-80dB @ 1 kHz, fully loaded
- Stereo channel separation
  - 42 Series: >90dB @ 1 kHz
  - All other models: >80dB @ 1 kHz
- CMRR: >75dB @ 20 Hz to 20 kHz

AUDIO INPUT — AUDIO MODELS ONLY

- Number/signal type: 4, 8, 12, or 16 stereo, balanced/unbalanced
- Connectors: (4, 8, 12, or 16) 3.5 mm captive screw connectors, 5 pole
- Impedance: >10 kohms unbalanced/balanced, DC coupled
- Nominal level: -10dBV (316mV)
- Maximum level: +19.5dBu, (balanced or unbalanced) at 1%THD+N
- Input gain adjustment
  - 42 Series: -18dB to +24dB adjustable per input by RS-232 or front panel
  - All other models: -15dB to +9dB, adjustable per input by RS-232 or front panel

AUDIO OUTPUT — AUDIO MODELS ONLY

- Number/signal type: 2, 4, 8, or 16 stereo, balanced/unbalanced
- Connectors: (2, 4, 8, or 16) 3.5 mm captive screw connectors, 5 pole
- Impedance: 50 ohms unbalanced, 100 ohms balanced
- Gain error: ±0.1dB channel to channel
- Maximum level (Hi-Z): >+21dBu, balanced or unbalanced at stated %THD+N
- Maximum level (600 ohm): >+15dBm, balanced or unbalanced at stated %THD+N

NOTE: *0dBu = 0.775 volts (RMS).*

CONTROL/REMOTE — SWITCHER

- Serial control port
  - 42 Series: 1 RS-232, 9-pin female D connector
  - All other models: 1 RS-232 or RS-422, 9-pin female D connector
- Program control: Extron's control program for Windows®
Extron's Simple Instruction Set™ – SIS™

GENERAL

- Power: 100VAC to 240VAC, 50/60 Hz, internal, autoswitchable
  - 42 Series: 40 watts
  - 84/88/124/128 Series: 30 watts
  - 168/1616 Series: 36 watts
- Rack mount: Yes, with included parts
- Enclosure type: Metal
- Enclosure dimensions
  - 42 Series: 1.75" H x 17.5" W x 9.5" D (1U high, full rack width)
(4.4 cm H x 44.5 cm W x 24.1 cm D)
(Depth excludes connectors. Width excludes rack ears.)
  - 84/88/124/128 Series: 5.25" H x 17.0" W x 9.4" D (3U high, full rack width)
(13.3 cm H x 43.2 cm W x 23.9 cm D)
(Depth excludes connectors. Width excludes rack ears.)
  - 168/1616 Series: 10.5" H x 17.0" W x 9.7" D (6U high, full rack width)
(26.7 cm H x 43.2 cm W x 24.6 cm D)
(Depth excludes connectors. Width excludes rack ears.)
- Product weight
  - 42 Series: 4.9 lbs (2.2 kg)
  - 84/88/124/128 Series: 14.8 lbs (6.7 kg)
  - 168/1616 Series: 19.4 lbs (8.8 kg)
- Shipping weight
  - 42 Series: 8 lbs (4 kg)
  - 84/88/124/128 Series: 21 lbs (10 kg)
  - 168/1616 Series: 26 lbs (12 kg)
    - DIM weight: 34
  - DIM weight
    - 42 Series
      - USA, Canada: 8 lbs (3.6 kg)
      - International: 9 lbs (4.1 kg)
    - 84/88/124/128 Series: 25 lbs
    - 168/1616 Series: 34 lbs
- Listings: UL, CUL
- Compliances
  - 42 Series: CE, FCC Class A, VCCI, AS/NZS, ICES
  - All other models: CE, FCC Class A
- Warranty: 3 years parts and labor

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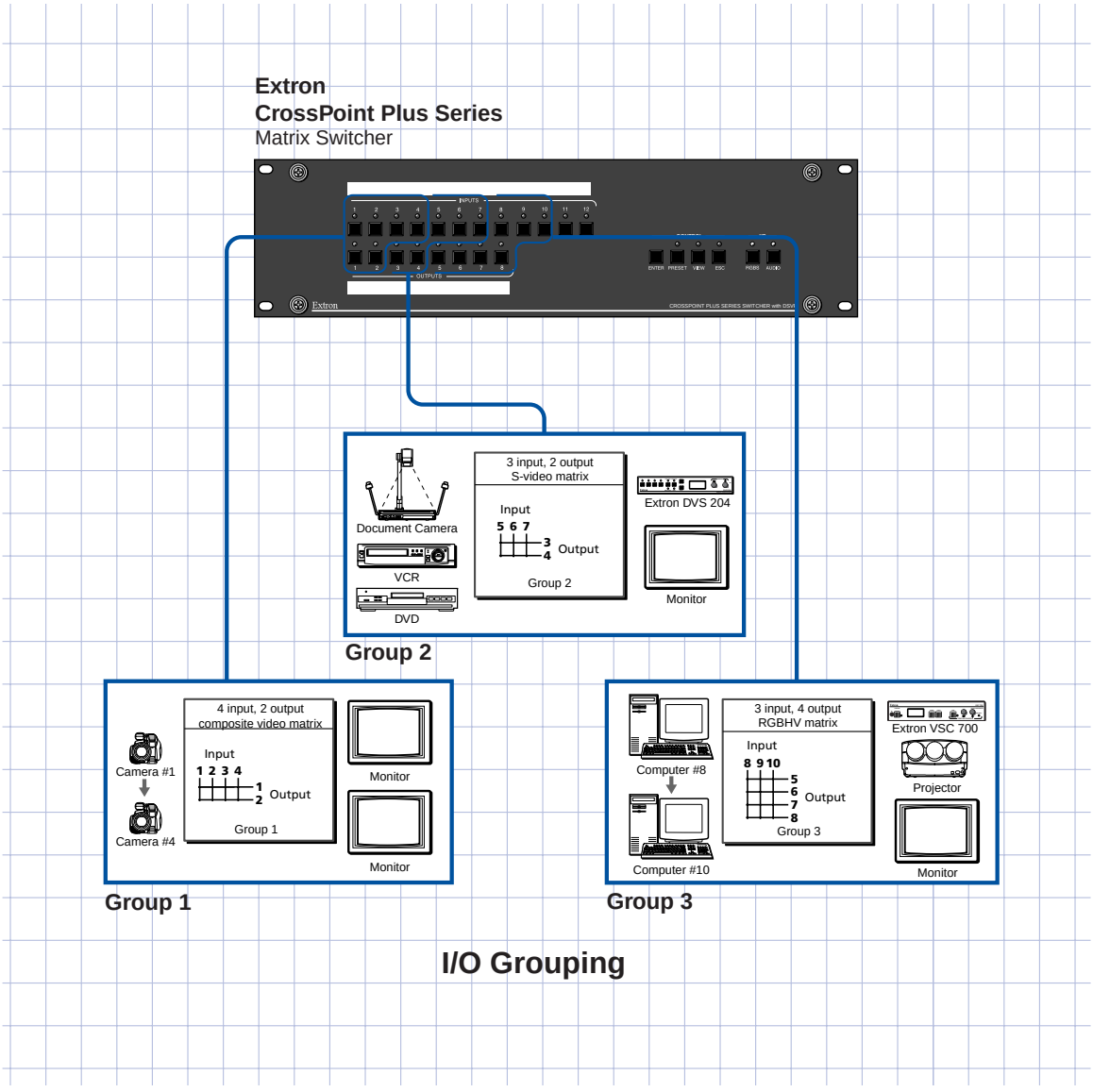
– *Ultra-Wideband RGB and Video* –



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CrossPoint Plus Series

Ultra-Wideband Matrix Switchers for RGBS, RGBHV and/or Stereo Audio

IP LINK™ HDTV READY! SIS™ Simple Instruction Set

DESCRIPTION

The Extron **CrossPoint Plus Series** are ultra-wideband, analog RGBHV matrix switchers. There are ten models available. Each model offers two versions: "HV" versions for switching RGBHV signals and "HVA" versions for switching RGBHV signals and two channel stereo audio (balanced and unbalanced). All models can also switch RGBS, RGsB, HDTV, component video, S-video, and composite video.

FEATURES

- **RGBHV–** The CrossPoint Plus HV models switch separate horizontal and vertical sync to ensure proper sync polarity, providing a more stable image. All models also switch RGBS, RGsB, HDTV, component video, S-video, and composite video.
- **Ultra-wideband RGB video bandwidth–** The Extron CrossPoint Plus Series provides a minimum of 425 MHz (-3dB) RGB video bandwidth, fully loaded. Designed for resolutions of 1280 x 1024 and up, the CrossPoint Plus Series maintains original signal integrity.
- **Digital Sync Validation Processing (DSVP™)–** Extron's exclusive DSVP verifies active sources by scanning all inputs for active sync signals. DSVP then transmits the horizontal and vertical scan rate information to the user via any type of control system using RS-232/422 commands.
- **Channel-to-channel isolation–** The CrossPoint Plus Series provides excellent isolation between channels and extremely low electromagnetic emissions— perfect for minimizing signal leakage in high security or government environments.
- **I/O grouping–** Allows the matrix to be virtually divided into smaller sub-switchers, making installation and control easier. I/O grouping allows specific outputs to be grouped together— such as those designated for a specific video format.
- **Triple-Action Switching™ (RGB delay)–** RGB delay blanks the screen when the matrix switcher switches to a new source. The new sync signals precede the RGB signals, so there is no glitch shown during the transition. The time delay between the RGB and sync signals is user adjustable up to five seconds.
- **QuickSwitch Front Panel Controller (QS-FPC™)–** QuickSwitch FPC allows for touch-of-a-button input and output selection. The Extron QuickSwitch technology eliminates the learning curve usually associated with switching the inputs and outputs of a matrix switcher by using a tactile front panel button for every input and output.
- **Front panel I/O label windows–** I/O buttons may be labeled by any Brother® P-Touch labeler or Extron label software, which ships with every Extron matrix switcher. Each input and output can be labeled with names, alphanumeric characters, or even color bitmaps for easy and intuitive input and output selection.
- **View I/O mode–** Allows user to easily see which individual inputs and outputs are actively connected. Available from the front panel or RS-232 and RS-422 control.
- **Global presets–** Individual I/O configurations may be saved and recalled either from the QuickSwitch front panel or RS-232 and RS-422. This time-saving feature allows you to set up I/O configurations and keep them in memory for future use.
- **RS-232 and RS-422 control–** The CrossPoint Plus Series switchers offer RS-232 and RS-422 control, allowing the switcher to be controlled via a third party control system.
- **Simple Instruction Set (SIS™)–** Extron SIS is a set of basic ASCII code commands that provide simple control through a third party control system. Instead of programming in long, obscure strings of code, SIS makes it easy to operate an Extron product using RS-232 and RS-422 control.
- **Control software–** For RS-232 and RS-422 remote control from a PC, Extron ships our Windows®-based control software with every matrix switcher. This icon-driven software uses a graphical, drag-and-drop interface to make I/O configuration and other customization functions simple and convenient. This software also offers an emulation mode for configuration of an offsite matrix switcher; the I/O configuration may then be saved for future downloading to the matrix switcher.
- **MCP 1000 and MKP 1000 control–** Utilizing the MCP 1000 Master Control Panel and any combination of MCP 1000 slave control panels or MKP 1000 control keypads offers the flexibility to control a CrossPoint Plus Matrix switcher from a remote location. Both remote control options are easy to use and provide tactile buttons for quick selection. Each MCP 1000 panel may be used for one-button switching for a particular output and selecting global presets. Each MKP 1000 keypad may be used to select a different input or select a preset.
- **Input audio gain and attenuation (adjustable via RS-232 and RS-422 or front panel)–** The Extron CrossPoint Plus Series allows users to set the level of audio gain or attenuation (-24dB to +9dB). Individual input audio levels may be adjusted so there are no noticeable volume differences between sources.
- **Front panel security lock out–** If a CrossPoint Plus Series Switcher is installed in an unsecured environment, an optional security lock out feature may be implemented. During lock-out mode, a special button combination is required to operate the front panel controller.
- **Internal international power supply–** The 100-240 volt, autoswitchable, internal power supply of the CrossPoint Plus Series provides worldwide power compatibility.

Additional features available only in the larger (24x12 - 32x32) models:

- **IP Link™ –** An IP integration technology developed by Extron specifically engineered to meet the needs of professional A/V environments, which enables the CrossPoint Plus Series to be controlled and proactively monitored over a LAN, WAN, or the Internet. An intuitive Web interface is also included for such common functions as I/O switching, system control, and online diagnostics and monitoring.
- **Web Page Serving Capabilities –** Extron IP Link control provides web hosting with online pages for full functionality and monitoring of the product via any web browser. In addition, custom web pages can be produced with any off-the-shelf web page development software program to create your own HTML pages or java applets.
- **Downloadable firmware updates –** The newest firmware can be conveniently downloaded from the Extron Web site. Updates for new features and capabilities can be easily upgraded through the RS-232, RS-422, or Ethernet port.
- **Audio output volume adjustment and muting –** Each individual output has volume control adjustment via the front panel or RS-232 control. Audio output levels can be set dynamically at different levels to feed the audio amplifier, thus eliminating the need for a pre-amplifier.
- **Redundant power supplies –** Primary and back-up power supplies for both positive and negative DC voltages are internally mounted. The primary power supply system is configured to support automatic fail-over switch to a hot spare power supply. This means no loss of functionality should the primary power supply fail.

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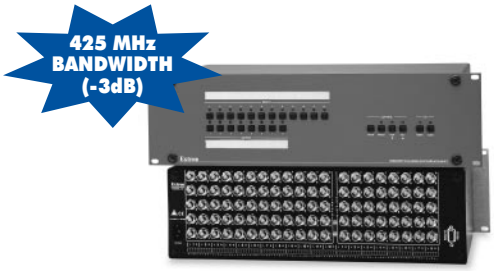
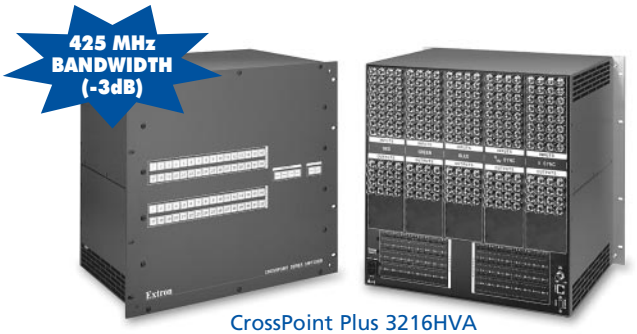
CrossPoint Plus Series (continued)...

CrossPoint Plus 88HVA



CrossPoint Plus 128HVA

CrossPoint Plus 1616HVA



CrossPoint Plus 3216HVA

CrossPoint Plus 3232HVA

8x4 Ultra-Wideband Matrix Switchers

Model	Part Number
CrossPoint Plus 84HV	60-337-02
CrossPoint Plus 84HVA	60-337-01

8x8 Ultra-Wideband Matrix Switchers

Model	Part Number
CrossPoint Plus 88HV	60-336-02
CrossPoint Plus 88HVA	60-336-01

12x4 Ultra-Wideband Matrix Switchers

Model	Part Number
CrossPoint Plus 124HV	60-335-02
CrossPoint Plus 124HVA	60-335-01

12x8 Ultra-Wideband Matrix Switchers

Model	Part Number
CrossPoint Plus 128HV	60-334-02
CrossPoint Plus 128HVA	60-334-01

16x8 Ultra-Wideband Matrix Switchers

Model	Part Number
CrossPoint Plus 168HV	60-333-02
CrossPoint Plus 168HVA	60-333-01

16x16 Ultra-Wideband Matrix Switchers

Model	Part Number
CrossPoint Plus 1616HV	60-332-02
CrossPoint Plus 1616HVA	60-332-01

24x12 Ultra-Wideband Matrix Switchers

Model	Part Number
CrossPoint Plus 2412HV	60-470-02
CrossPoint Plus 2412HVA	60-470-01

24x24 Ultra-Wideband Matrix Switchers

Model	Part Number
CrossPoint Plus 2424HV	60-468-02
CrossPoint Plus 2424HVA	60-468-01

32x16 Ultra-Wideband Matrix Switchers

Model	Part Number
CrossPoint Plus 3216HV	60-471-02
CrossPoint Plus 3216HVA	60-471-01

32x32 Ultra-Wideband Matrix Switchers

Model	Part Number
CrossPoint Plus 3232HV	60-469-02
CrossPoint Plus 3232HVA	60-469-01

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CrossPoint Plus Series (continued)...

SPECIFICATIONS

VIDEO

Routing	
84 Series	8 x 4 matrix
88 Series	8 x 8 matrix
124 Series	12 x 4 matrix
128 Series	12 x 8 matrix
168 Series	16 x 8 matrix
1616 Series	16 x 16 matrix
2412 Series	24 x 12 matrix
2424 Series	24 x 24 matrix
3216 Series	32 x 16 matrix
3232 Series	32 x 32 matrix
Gain	Unity
Bandwidth	425 MHz (-3dB), fully loaded
84/88/124/128/168/1616 Series	0 - 10 MHz — no more than +0.1dB to -0.1dB 0 - 130 MHz — no more than +6dB to -0.8dB
2412/2424/3216/3232 Series	0 - 10 MHz — no more than +0.1dB to -0.1dB 0 - 130 MHz — no more than +4dB to -0.1dB
Crosstalk	
84/88/124/128/168/1616 Series	-80dB @ 1 MHz, -65dB @ 10 MHz, -55dB @ 30 MHz, -42dB@ 100 MHz
2412/2424/3216/3232 Series	-55dB @ 10 MHz, -45dB @ 30 MHz, -37dB @ 100 MHz
Switching speed	200 ns (max.)

VIDEO INPUT

Number/signal type	8, 12, 16, 24, or 32 RGBHV, RGBS, RGsB, RsGsBs, HDTV, component video, S-video, composite video
Connectors	
84/88 Series	8 x 5 BNC female
124/128 Series	12 x 5 BNC female
168/1616 Series	16 x 5 BNC female
2412/2424 Series	24 x 5 BNC female
3216/3232 Series	32 x 5 BNC female
Nominal level	1V p-p for Y of component video and S-video, and for composite video 0.7V p-p for RGB 0.3V p-p for R-Y and B-Y of component video, and for C of S-video
Minimum/maximum levels	Analog: 0.5V to 2.0V p-p with no offset
Impedance	75 ohms
Return loss	-30dB @ 5 MHz
Maximum DC offset	1.5V

VIDEO OUTPUT

Number/signal type	4, 8, 12, 16, 24, or 32 RGBHV, RGBS, RGsB, RsGsBs, HDTV, component video, S-video, composite video
Connectors	
84/124 Series	4 x 5 BNC female
88/128 Series	8 x 5 BNC female
168 Series	8 x 5 BNC female
1616 Series	16 x 5 BNC female
2412 Series	12 x 5 BNC female
2424 Series	24 x 5 BNC female
3216 Series	16 x 5 BNC female
3232 Series	32 x 5 BNC female
Nominal level	1V p-p for Y of component video and S-video, and for composite video 0.7V p-p for RGB 0.3V p-p for R-Y and B-Y of component video, and for C of S-video
Minimum/maximum level	2V p-p
Impedance	75 ohms
Return loss	-30dB @ 5 MHz
DC offset	±5mV maximum with input at 0 offset
Switching type	Triple-Action

SYNC

Input type	RGBHV, RGBS, RGsB, RsGsBs
Output type	RGBHV, RGBS, RGsB, RsGsBs
Input level	0.5V to 5.0V p-p, 4.0V p-p normal
Output level	AGC to TTL: 4V to 5V p-p, unterminated
Input impedance	
84/88/124/128 Series	Inputs 1 to 4 — 75 or 510 ohms, switchable Inputs 5 to 12 — 510 ohms
168/1616 Series	Inputs 1, 3, 5, 7 — 75 or 510 ohms, switchable Inputs 2, 4, 6, 8, and 9 to 16 — 510 ohms
2412/2424/3216/3232 Series	Inputs 1 to 8 — 75 or 510 ohms, switchable Inputs 9 to 32 — 510 ohms
Output impedance	75 ohms
Polarity	Positive or negative (follows input)

AUDIO — AUDIO MODELS ONLY

Routing	
84 Series	8 x 4 stereo matrix
88 Series	8 x 8 stereo matrix
124 Series	12 x 4 stereo matrix
128 Series	12 x 8 stereo matrix
168 Series	16 x 8 stereo matrix
1616 Series	16 x 16 stereo matrix
2412 Series	24 x 12 stereo matrix
2424 Series	24 x 24 stereo matrix
3216 Series	32 x 16 stereo matrix
3232 Series	32 x 32 stereo matrix
Gain	
8-, 12-, 16-input models	Unbalanced output: 0dB; balanced output: +6dB
24- and 32-input models	Unbalanced output: -6dB; balanced output: 0dB
Frequency response	20 Hz to 20 kHz, ±0.05dB
THD + Noise	0.03% @ 1 kHz at rated nominal level
S/N	>90dB, balanced, at rated maximum output (21dBu)
Crosstalk	<-80dB @ 1 kHz, fully loaded
Stereo channel separation	>80dB @ 1 kHz
CMRR	>75dB @ 20 Hz to 20 kHz

AUDIO INPUT — AUDIO MODELS ONLY

Number/signal type	8, 12, 16, 24, or 32 stereo, balanced/unbalanced
Connectors	(8, 12, 16, 24, or 32) 3.5 mm captive screw connectors, 5 pole
Impedance	>10 kohm, balanced/unbalanced, DC coupled
Nominal level	-10dBV (316mV)
Maximum level	+19.5dBu, (balanced or unbalanced) at 1%THD+N
Input gain adjustment	
84/88/124/128/168/1616 Series	-15dB to +9dB, adjustable per input by RS-232/422 or front panel
2412/2424/3216/3232 Series	-18dB to +24dB, adjustable per input by RS-232/422 or front panel

AUDIO OUTPUT — AUDIO MODELS ONLY

Number/signal type	4, 8, 12, 16, 24, or 32 stereo, balanced/unbalanced
Connectors	(4, 8, 12, 16, 24, or 32) 3.5 mm captive screw connectors, 5 pole
Impedance	50 ohms unbalanced, 100 ohms balanced
Gain error	±0.1dB channel to channel
Maximum level (Hi-Z)	>+21dBu, balanced or unbalanced at 1%THD+N
Maximum level (600 ohm)	>+15dBm, balanced or unbalanced at 1%THD+N

NOTE: *0dBu = 0.775 volts (RMS).*

CONTROL/REMOTE — SWITCHER

Serial control port	1 RS-232 or RS-422, 9-pin female D connector
Ethernet control port	2412/2424/3216/3232 Series only: 1 RJ-45 female connector
Ethernet data rate	2412/2424/3216/3232 Series only: 10/100Base-T, half/full duplex with autodetect
Ethernet protocol	2412/2424/3216/3232 Series only: ARP, ICMP (ping), TCP/IP, Telnet, HTTP
Program control	
2412/2424/3216/3232 Series	Extron's control program for Windows® Extron's Simple Instruction Set™ (SIS™) Microsoft Explorer, Netscape Navigator, Telnet
All other models	Extron's control program for Windows® Extron's Simple Instruction Set (SIS)

GENERAL

Power	
8-, 12-, 16-input models	100VAC to 240VAC, 50/60 Hz, internal, autoswitchable
84/88/124/128	30 watts
168/1616	36 watts
24- and 32-input models	2 (primary and redundant), 100VAC to 240VAC, 50/60 Hz, internal, autoswitchable
2412/2424 Series	150 watts
3216/3232 Series	180 watts
Rack mount	Yes, with included parts
Enclosure type	Metal
Enclosure dimensions	
84/88/124/128 Series	5.25" H x 17.0" W x 9.4" D (3U high, full rack width) 13.3 cm H x 43.2 cm W x 23.9 cm D (Depth excludes connectors. Width excludes rack ears.)
168/1616 Series	10.5" H x 17.0" W x 9.7" D (6U high, full rack width) 26.7 cm H x 43.2 cm W x 24.6 cm D (Depth excludes connectors. Width excludes rack ears.)
2412/3216 HV and HVA Series	14.0" H x 17.0" W x 12.0" D (8U high, full rack width) (35.5 cm H x 43.2 cm W x 30.5 cm D) (Depth excludes connectors. Width excludes rack ears.)
2424/3232 HV and HVA Series	17.5" H x 17.0" W x 12.0" D (10U high, full rack width) (44.5 cm H x 43.2 cm W x 30.5 cm D) (Depth excludes connectors. Width excludes rack ears.)
Product weight	
84/88/124/128 Series	14.4 lbs (6.5 kg)
168/1616 Series	19.4 lbs (8.8 kg)
2412/3216 Series	32 lbs (14.5 kg)
2424/3232 Series	36 lbs (14.5 kg)
Shipping weight	
84/88/124/128 Series	21 lbs (9.5 kg)
DIM weight	25
168/1616 Series	26 lbs (11.8 kg)
DIM weight	34
2412/3216 Series	35 lbs (15.9 kg)
DIM weight	77
2424/3232 Series	40 lbs (18.1 kg)
DIM weight	77
Listings	UL, CUL
Compliances	
2412/2424/3216/3232 Series	CE, FCC Class A, VCCI, AS/NZS, ICES
All other models	CE, FCC Class A
Warranty	3 years parts and labor

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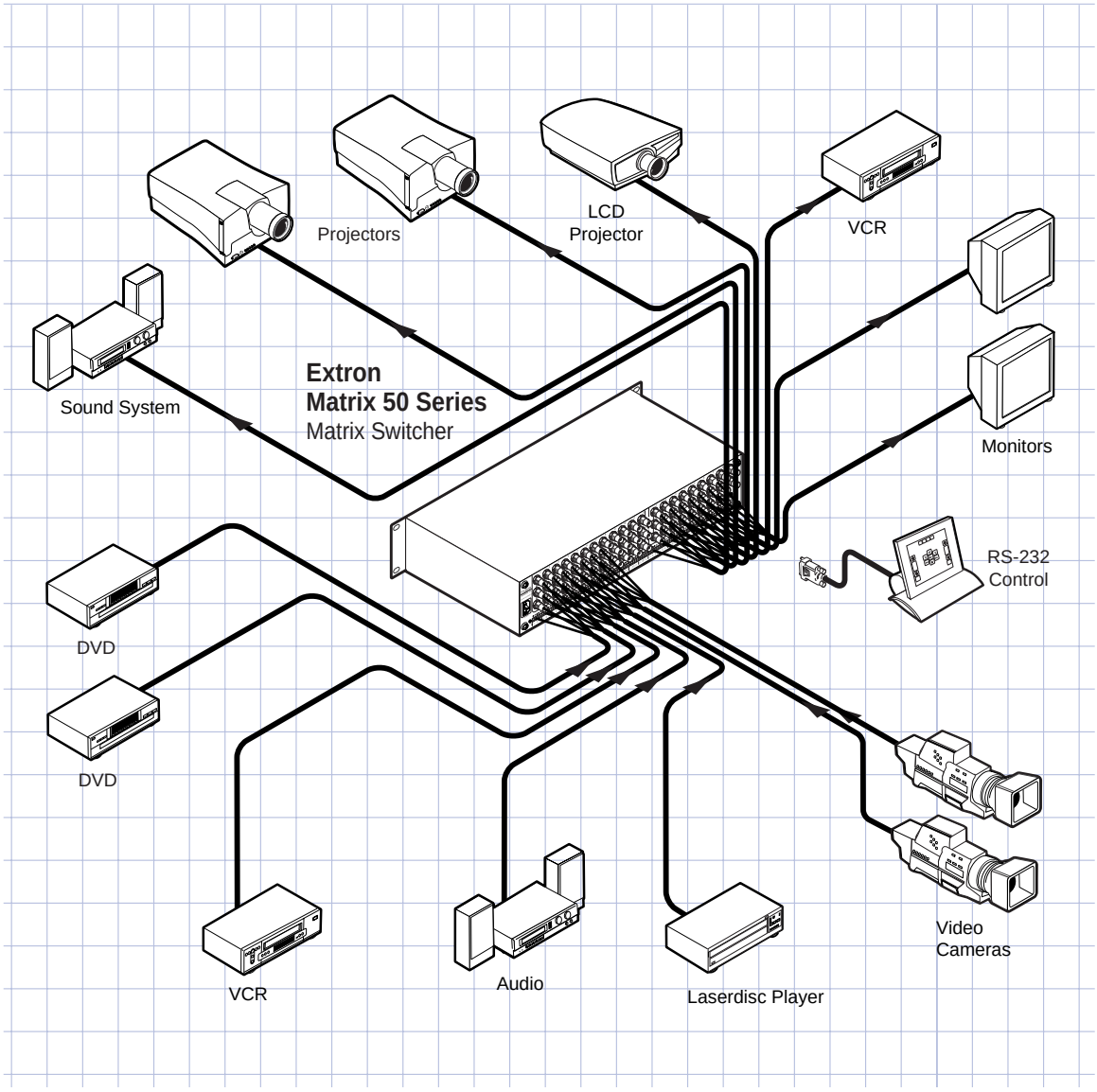
– Configurable Video –



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Matrix 50 Series

Video, S-Video, HDTV/Component Video, and/or Stereo Audio Matrix Switchers

SIS™ Simple Instruction Set

DESCRIPTION

The Extron **Matrix 50 Series** are broadcast quality matrix switchers capable of switching multiple composite video, S-video, component video, HDTV, and stereo audio (balanced and unbalanced) signals. Matrix switchers are used in applications where multiple input sources (e.g., VCRs, cameras, VTRs, DVD players, etc.) must be switched to more than one output destination (e.g., monitor, projector, etc.) either simultaneously or individually.

The Extron Matrix 50 Series modules are available in four different input/output (I/O) sizes: 8x4, 8x8, 12x4, and 12x8. Each switcher has one audio channel (mono or stereo) and three video channels that are capable of being populated/customized to suit the requirements of any system. For example, if a system requires I/O switching of video with stereo audio follow, then only one video and one audio module is required. But, if the system requires switching of S-video and stereo audio, then two video modules and one audio module would be required. Thus, for component video, three video modules would be needed. Each Matrix 50 is designed with only the required video and audio modules.

FEATURES

- **150 MHz (-3dB) video bandwidth, fully loaded–** Ensures switching and distribution of video signals without degradation. The 150 MHz (-3dB) rating is a worst case specification, i.e., the Matrix 50 Series Switcher provides 150 MHz (-3dB) fully loaded (when one input signal drives all outputs).
- **Field upgradeable and modular design–** The Matrix 50 Series Switchers provide the highest level of cost-effectiveness, flexibility, and expandability by allowing users to purchase only the modules required for their systems. Additional modules may be added at any time without having to send the unit back to the factory for expansion or application change.
- **QuickSwitch Front Panel Controller (QS-FPC™)–** The QuickSwitch FPC feature allows for touch-of-a-button input and output selection. The Extron QuickSwitch technology eliminates the learning curve usually associated with switching the inputs and outputs of a matrix switcher by using a tactile front panel button for every input and output.
- **Front panel I/O label windows–** I/O buttons may easily be labeled by any Brother® P-Touch labeler or Extron label software, which ships with every Extron matrix switcher. Each input and output can be labeled with names, alphanumeric characters, or even color bitmaps for easy and intuitive input and output selection.
- **View I/O mode–** Allows users to easily see which individual inputs and outputs are actively connected. Available from the front panel or RS-232 control.
- **12 global presets–** The Matrix 50 Series Switchers can be configured for several different applications without having to change the settings each time the application changes.
- **Video genlock–** All Matrix 50 Series Switchers include broadcast quality NTSC, PAL, and SECAM video genlock capabilities, which allow for vertical interval switching, resulting in smooth, seamless transitions when switching between inputs.
- **Simple Instruction Set (SIS™)–** Extron SIS is a set of basic ASCII code commands that provide simple control through a third party control system. Instead of programming in long, obscure strings of code, the SIS makes it easy to operate an Extron product using RS-232 control.
- **Control software–** Extron has developed a Windows® based software program that provides the ability to mix and match inputs to outputs. This program, shipped with every Matrix 50 Series Switcher, makes I/O configuration simple because it uses graphic icons and icon labeling capabilities.
- **MCP 1000 and MKP 1000 control–** Utilizing the MCP 1000 Master Control Panel and any combination of MCP 1000 slave control panels or MKP 1000 control keypads offers the flexibility to control a Matrix 50 Series Switcher from a remote location or room. Both remote control options are easy to use and provide tactile buttons for quick selection. Each MCP 1000 panel may be used for one-button switching for a particular output and selecting global presets. Each MKP 1000 keypad may be used to select a different input or select a preset.
- **Balanced or unbalanced stereo audio–** The Matrix 50 Series offers the flexibility for both balanced or unbalanced audio signals. Depending on the application and cable distance requirements, some systems will require balanced audio.
- **Input audio gain and attenuation (adjustable via RS-232/422 or front panel)–** The Extron Matrix 50 Series Switchers allow users to set the level of audio gain or attenuation (-15dB to +9dB). Individual input audio levels may be adjusted so there are no noticeable volume differences between sources.
- **Audio breakaway–** With breakaway switching, the Matrix 50 Series Switchers can separate the audio signal from the video signal to switch either video only or audio only. The breakaway feature allows audio follow on any one or all channels, or can be operated as a separate audio matrix.
- **Input and output connectors–** All connectors are clearly labeled as either inputs or outputs for easy installation. Each input, as well as each output, is individually buffered to provide maximum performance and virtually no crosstalk.
- **Rack-mountable–** The Matrix 50 Series Switchers are rack-mountable in any 2U high, 19-inch rack using included hardware.
- **Internal international power supply–** The 100-240 volt, autoswitchable, internal power supply provides worldwide power compatibility.

PART NUMBERS FOR THE MATRIX 50 OPTION KITS

Kits can be ordered from Extron for adding modules to an existing Matrix 50. These kits include all the necessary parts, as well as instructions for a qualified person to add capabilities to a Matrix 50.

8x4 Video Kit.....70-165-01
8x8 Video Kit.....70-165-02
12x4 Video Kit.....70-165-03
12x8 Video Kit.....70-165-04
8x4 Audio Kit 70-166-01
8x8 Audio Kit 70-166-02
12x4 Audio Kit 70-166-03
12x8 Audio Kit 70-166-04

OPTIONAL ACCESSORIES

IPL T S2 Ethernet-to-Serial Interface.....60-298-01 (page 240)
SVHS-BNC adapter (male to female) .....26-353-01 (page 399)
BNCM-RCA F adapter .....10-264-01 (page 400)
CSR 6 adapter .....26-575-01 (page 418)

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Matrix 50 Series (continued)...

Matrix 50 12 x 8
Composite Video & Audio

Composite Video & Stereo Audio Matrix Switchers

Composite Video Matrix Switchers			Part Number
Matrix 50	8x4	Composite Video	60-359BZ
Matrix 50	8x8	Composite Video	60-359EZ
Matrix 50	12x4	Composite Video	60-359HZ
Matrix 50	12x8	Composite Video	60-359KZ

Composite Video & Stereo Audio Matrix Switchers			Part Number
Matrix 50	8x4	Composite Video and Audio	60-359BY
Matrix 50	8x8	Composite Video and Audio	60-359EX
Matrix 50	12x4	Composite Video and Audio	60-359HW
Matrix 50	12x8	Composite Video and Audio	60-359KV

Matrix 50 12 x 8
S-video & Audio

S-Video & Stereo Audio Matrix Switchers

S-Video Matrix Switchers			Part Number
Matrix 50	8x4	S-Video	60-359CZ
Matrix 50	8x8	S-Video	60-359FZ
Matrix 50	12x4	S-Video	60-359IZ
Matrix 50	12x8	S-Video	60-359LZ

S-Video & Stereo Audio Matrix Switchers			Part Number
Matrix 50	8x4	S-Video and Audio	60-359CY
Matrix 50	8x8	S-Video and Audio	60-359FX
Matrix 50	12x4	S-Video and Audio	60-359IW
Matrix 50	12x8	S-Video and Audio	60-359LV

HDTV READY!

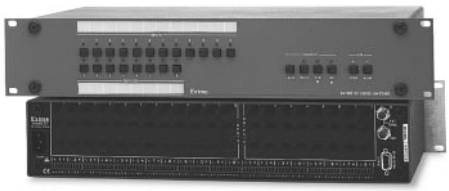
Matrix 50 12 x 8
Component Video & Audio

HDTV/Component Stereo Audio & Video Matrix Switchers

HDTV/Component Video Matrix Switchers			Part Number
Matrix 50	8x4	HDTV/Component Video	60-359DZ*
Matrix 50	8x8	HDTV/Component Video	60-359GZ*
Matrix 50	12x4	HDTV/Component Video	60-359JZ*
Matrix 50	12x8	HDTV/Component Video	60-359MZ*

HDTV/Component Video & Stereo Audio Matrix Switchers			Part Number
Matrix 50	8x4	HDTV/Component Video and Audio	60-359DY*
Matrix 50	8x8	HDTV/Component Video and Audio	60-359GX*
Matrix 50	12x4	HDTV/Component Video and Audio	60-359JW*
Matrix 50	12x8	HDTV/Component Video and Audio	60-359MV*

**Also switches RGsB (red, green, blue with sync on green) signals up to 150 MHz bandwidth*



Matrix 50 12 x 8
Stereo Audio

Stereo Audio Matrix Switchers

Balanced or Unbalanced Stereo Audio Matrix Switchers			Part Number
Matrix 50	8x4	Stereo Audio	60-359AY
Matrix 50	8x8	Stereo Audio	60-359AX
Matrix 50	12x4	Stereo Audio	60-359AW
Matrix 50	12x8	Stereo Audio	60-359AV

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Matrix 50 Series (continued)...

SPECIFICATIONS

VIDEO

Routing	8 x 4, 8 x 8, 12 x 4, or 12 x 8 matrix
Gain	Unity
Bandwidth	150 MHz (-3dB), fully loaded 0 - 10 MHz — no more than 0.1dB to -0.1dB 0 - 130 MHz — no more than 0.5dB to -0.5dB
Phase between I/Os	<1.28° at 3.58 MHz
Differential phase error	0.1%, 3.58 and 4.43 MHz
Differential gain error	0.1°, 3.58 and 4.43 MHz
Max. propagation of delay	5 ns typical (±1 ns)
Crosstalk	-50dB @ 5 MHz
Switching speed	200 ns (max.)

VIDEO INPUT

Number/signal type	8 or 12 RGsB, RsGsBs, component video (Y, R-Y, B-Y), HDTV, S-video, composite video
Connectors	(8 or 12) x 1, 2, or 3 BNC female
Nominal levels	1V p-p for Y of component video and S-video, and for composite video 0.7V p-p for RGB 0.3V p-p for R-Y and B-Y of component video, and for C of S-video
Minimum/maximum levels	Analog: 0.5V to 2V p-p with no offset
Impedance	75 ohms
Return loss	-30dB @ 5 MHz
Maximum DC offset	1.5V
External sync (genlock)	0.3V to 0.4V p-p

VIDEO OUTPUT

Number/signal type	4 or 8 RGsB, RsGsBs, component video (Y, R-Y, B-Y), HDTV, S-video, composite video
Connectors	(4 or 8) x 1, 2, or 3 BNC female
Nominal levels	1V p-p for Y of component video and S-video, and for composite video 0.7V p-p for RGB 0.3V p-p for R-Y and B-Y of component video, and for C of S-video
Minimum/maximum levels	0.5V to 2.0V p-p
Impedance	75 ohms
Return loss	-30dB @ 5 MHz
DC offset	±5mV maximum with input at 0 offset
Switching type	Vertical interval

SYNC

Input type	RGsB, RsGsBs
Output type	RGsB, RsGsBs
Genlock connectors	BNC female
Standards	NTSC 3.58, NTSC 4.43, PAL, SECAM

AUDIO

Routing	8 x 4, 8 x 8, 12 x 4, or 12 x 8 matrix
Gain	Unbalanced output: 0dB; balanced output: +6dB
Frequency response	20 Hz to 20 kHz, ±0.05dB
THD + Noise	0.03% @ 1 kHz at nominal level
S/N	>90dB, balanced, at rated maximum output (21dBu)
Crosstalk	<-80dB @ 1 kHz, fully loaded
Stereo channel separation	>80dB @ 1 kHz
THD	0.015%, worst case, @ 20 Hz to 20 kHz
CMRR	>75dB @ 20 Hz to 20 kHz

AUDIO INPUT

Number/signal type	8 or 12 balanced/unbalanced
Connectors	(8 or 12) 3.5 mm captive screw connectors, 5 pole
Impedance	>10 kohm, unbalanced/balanced, DC coupled
Nominal level	-10dBV (316mV)
Maximum level	+19.5dBu, (balanced or unbalanced) at 1%THD+N
Input gain adjustment	–15dB to +9dB, adjustable per input via RS-232 or front panel

AUDIO OUTPUT

Number/signal type	4 or 8 stereo, balanced/unbalanced
Connectors	(4 or 8) 3.5 mm captive screw connectors, 5 pole
Impedance	Unbalanced 50 ohms, balanced 100 ohms
Gain	Unbalanced 0dBu, balanced +6dBu
Gain error	±0.1dB channel to channel
Maximum output (Hi-Z)	>+21dBu, balanced at stated %THD+N
Maximum output (600 ohm)	>+15dBm, balanced at stated %THD+N

NOTE: *0dBu = 0.775 volts (RMS).*

CONTROL/REMOTE

Serial control port	RS-232 or RS-422, 9-pin female D connector
Program control	Extron's control program for Windows® Extron's Simple Instruction Set™ – (SIS™)

GENERAL

Power	100VAC to 240VAC, 50/60 Hz, 30 watts, internal, autoswitchable
Rack mount	Yes
Enclosure type	Metal
Enclosure dimensions	3.5" H x 17.0" W x 9.5" D (2U high, full rack width) 8.9 cm H x 43.2 cm W x 24.1 cm D (Depth excludes connectors. Width excludes rack ears.)
Product weight	8.6 lbs (3.9 kg)
Shipping weight	15 lbs (6.8 kg)
DIM weight	25
Listings/Compliances	UL, CUL, CE, FCC Class A
Warranty	3 years parts and labor

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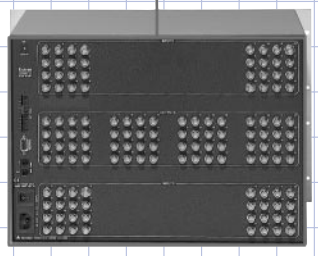
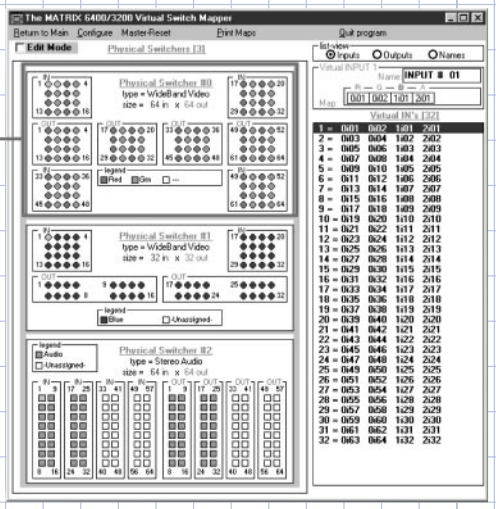
Matrix 3200 & 6400 Series

Matrix Switchers

– Modular & Video Systems –



Extron Matrix 6400
Matrix Switcher



Easy Expansion and Installation with Extron Virtualization/Control Software

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Matrix 3200 & 6400 Series

Fully Configurable Matrix Switchers

HDTV READY!

SIS™ Simple Instruction Set

Matrix 6400 Series Switcher

DESCRIPTION

The Extron **Matrix 3200 and 6400 Series** Matrix Switchers are solutions for large scale routing applications that require up to 64 inputs and 64 outputs. With user-friendly control via the front panel, MKP 1000 remote keypad, or MCP 1000 Master Control Panel, the Matrix 3200 and 6400 switchers provide totally customizable and modular switching of composite video, S-video, component video, RGsB, RGBS, RGBHV, and one or two channel audio. With an RGB bandwidth of 430 MHz (-3dB) fully loaded, the Matrix 3200 and 6400 Wideband Series can maintain the integrity of any routed signal.

Matrix 3200 and 6400 Series switchers include configurations of wideband, low resolution video, sync, and stereo or mono audio models. Each model allows for 16 x 8 switching with the flexibility to upgrade to full 32 x 32 or 64 x 64 routing applications. With 128 BNC connectors on the rear panel and modular internal card slots ready to be filled as needed, the Matrix 6400 switchers can grow to accommodate any system—even systems that are still expanding.

Rooming Presets and Virtualization

Using a feature called "rooming," each Matrix 3200 and 6400 switcher can be programmed to group multiple outputs to specific "rooms," allowing them to have their own presets. Each room can consist of up to 16 signals and each matrix can support up to 10 rooms. A total of 100 room presets are available, providing added flexibility and convenience, particularly in systems where switching is required between several locations. Once a room has been configured and stored, it is switched independently of other rooms so that signals sent to one room will never "walk" in on another room.

Rooming is made possible by user-defined virtual maps, which ascribe "locality" to the physical inputs and outputs of the Matrix 3200 and 6400 Switchers. Virtual mapping makes it possible to configure the switchers in unique ways, dictated by each virtual input/output (i.e., the assignment of each individual connector) and each group of connectors (called a *virtual plane*). The Extron virtualization/control software makes these configurations possible. The software easily translates the appropriate virtual map into the switcher's memory with minimal effort on the part of the installer.

Rooming presets go beyond normal matrix switching capabilities, which are offered with the Matrix 3200 and 6400 switchers as global presets. These global presets can be set to define configurations of specific inputs to any specific combination of outputs or to all outputs. Rooming presets and global presets can be programmed and recalled (activated) at the front panel or by remote.

FPC 1000, MKP 1000, and MCP 1000

With the Matrix 3200 and 6400 Series control options, controlling any system is easy. RS-232/RS-422 control and programming is easy and quick with Extron's Simple Instruction Set (SIS™).

FEATURES

- **430 MHz (-3dB) RGB video bandwidth, fully loaded (wideband models)–** Ensures switching and distribution of signals without signal degradation. The 430 MHz (-3dB) rating is a worst case specification, i.e., the Matrix 3200/6400 Series Switchers provide 430 MHz (-3dB) at full performance capacity when one input signal drives all outputs.
- **150 MHz (-3dB) video bandwidth, fully loaded (low resolution models)–** Ensures switching and distribution of signals without signal degradation. The 150 MHz (-3dB) rating is a worst case specification, i.e., the Matrix 3200/6400 Series Switchers provide 150 MHz (-3dB) at full performance capacity when one input signal drives all outputs.
- **Field upgradeable and modular design–** The Matrix 3200 and 6400 Series switchers provide the highest level of cost-effectiveness, flexibility, and expandability by allowing users to purchase only the modules required for their systems. Additional modules may be added at any time without having to send the unit back to the factory for expansion or application change.
- **Rooming–** Provides presets for up to 10 rooms for a total of up to 100 rooming presets for added flexibility and control in routing signals.
- **Triple-Action Switching™–** The Matrix 3200 and 6400 Series switchers are capable of programmable RGB delay on every output. This allows for blanking of RGB signals when switching multiple inputs/outputs. When switching, all projectors/monitors will display black instead of a scrambled image.
- **Optional redundant power supply–** An additional power supply may be internally mounted to give the Matrix 3200 and 6400 Series switchers a backup power supply. This feature may be necessary in critical applications where power reliability is a crucial factor.
- **FPC 1000 LCD Front Panel Controller–** The FPC 1000 has a large LCD window that allows direct access and total control over all presets and switching functions. Menus in the FPC 1000 provide an intuitive interface for easy setup and programming.
- **Presets–** The Matrix 3200 and 6400 Series switchers can be configured for several different applications without the need for changing the settings each time the application changes. 32 global presets and 100 rooming presets (10 presets for each of 10 rooms) are available.
- **Video genlock–** All Matrix 3200 and 6400 Series switchers include broadcast quality NTSC, PAL, and SECAM video genlock capabilities, which allow for vertical interval switching, resulting in smooth, seamless transitions when switching between inputs.
- **Input and output connectors are clearly labeled–** All connectors are clearly labeled for easy installation. With the Extron virtualization/control software, a visual map can be printed for easy representation of the virtual I/Os. This feature reduces the time required for setup and programming.
- **RS-232 and RS-422 control–** The Matrix 3200 and 6400 Series switchers offer RS-232 and RS-422 control, which allows the switcher to be controlled via a third party control system.

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Matrix 3200 & 6400 Series (continued)...

Matrix 3200 Series Switcher

- **Simple Instruction Set (SIS™)–** Extron SIS is a set of basic ASCII code commands that provide simple control through a third party control system. Instead of programming in long, obscure strings of code, the SIS makes it easy to operate an Extron product using RS-232 and RS-422 control.
- **Extron virtualization/control software–** Extron has developed a Windows®-based software that provides the ability to mix and match inputs to outputs. This program, shipped with every Matrix 3200 and 6400 Series switcher, makes I/O configuration simple because it uses graphic icons and icon labeling capabilities. More importantly, the software also allows users to configure the switcher via an emulation mode even if the switcher is not available. Once the matrix is built with the software and the configuration is saved, the switcher is ready to operate.
- **MCP 1000 and MKP 1000 control–** Utilizing the MCP 1000 Master Control Panel and any combination of MCP 1000 slave control panels or MKP 1000 control keypads offers the flexibility to control a Matrix 3200 and 6400 Series switcher from a remote location. Both remote control options are easy to use and provide tactile buttons for quick selection. Each MCP 1000 panel may be used for one-button switching for a particular output and selecting global presets. Each MKP 1000 keypad may be used to select a different input or select a preset.

MKP 1000 & MCP 1000

NEW

- **Balanced or unbalanced mono or stereo audio–** The Matrix 3200 and 6400 Series offers the flexibility for both balanced or unbalanced audio signals. Depending on the application and cable distance requirements, some systems will require balanced audio.
- **Adjustable input audio gain and attenuation–** The Extron Matrix 3200 and 6400 Series switchers allow users to set the level of audio from front panel controls or RS-232 and RS-422, whether for gain or attenuation (-15dB to +9dB).
- **Audio breakaway–** With breakaway switching, the Matrix 3200 and 6400 switchers can separate the audio signal from the video signal to switch either video only or audio only. The breakaway feature allows audio follow on any one or all channels, or can be operated as a separate audio matrix.
- **Trouble status indication–** The Matrix 3200 and 6400 Series switchers track status indicators at all times, and with the FPC 1000, the installer can monitor RS-232 and RS-422 communications from and to the unit. This saves valuable time in troubleshooting.
- **Front panel security lockout–** If a Matrix 3200 and 6400 Series switcher is installed in an unsecured environment, an optional password feature can be implemented. When this feature is in use, a password is required to operate the front panel controller.
- **Rack-mountable–** The Matrix 3200 and 6400 Series switchers are rack-mountable in any conventional 19-inch rack using included hardware.

OPTIONAL ACCESSORIES

IPL T S2 Ethernet-to-Serial Interface.....60-298-01 (page 240)
MCP 1000M.....60-298-01 (page 411)
MKP 1000 (gray, black, white) .....60-239-0X (page 410)
MKP 1000 WT (gray, black, white).....60-239-5X (page 410)

SPECIFICATIONS

VIDEO — WIDEBAND VIDEO BME

Routing	16 x 8 or larger matrix up to 32 x 32 or 64 x 64, depending on model and configuration
Gain	Unity
Bandwidth	
Matrix Wideband	430 MHz (-3dB), fully loaded 0 MHz to 10 MHz — no more than +0.1dB to -0.1dB 0 MHz to 130 MHz — no more than +4dB to -0.25dB
Phase between I/Os	<1.28° at 3.58 MHz
Differential phase error	0.1%, 3.58 MHz and 4.43 MHz
Differential gain error	0.1°, 3.58 MHz and 4.43 MHz
Max. propagation of delay	5 ns typical (±1 ns)
Crosstalk	-80dB @ 1 MHz, -62dB @ 10 MHz, -52dB @ 30 MHz
Switching speed	200 ns (max.)

VIDEO — LOW RESOLUTION VIDEO BME

Routing	16 x 8 or larger matrix up to 32 x 32 or 64 x 64, depending on model and configuration
Gain	Unity
Bandwidth	
Matrix Low Res.	150 MHz (-3dB), fully loaded 0 MHz to 10 MHz — no more than +0.1dB to -0.1dB 0 MHz to 30 MHz — no more than +0.5dB to -0.5dB
Crosstalk	80dB @ 1 MHz, -62dB @ 10 MHz, -52dB @ 30 MHz
Switching speed	200 ns (max.)

VIDEO INPUT — WIDEBAND VIDEO BME

Number/signal type	Up to 32 or 64 (varies with configuration) RGBHV, RGBS, RGsB, RsGsBs, component video, S-video, composite video
Connectors	BNC female (quantity varies with configuration)
Nominal level	1V p-p for Y of component video and S-video, and for composite video 0.7V p-p for RGB 0.3V p-p for R-Y and B-Y of component video, and for C of S-video
Minimum/maximum levels	Analog — 0.5V to 1.5V p-p with no offset
Impedance	75 ohms
Return loss	-30dB @ 5 MHz

VIDEO INPUT — LOW RESOLUTION VIDEO BME

Number/signal type	Up to 32 or 64 (varies with configuration) RGsB, RsGsBs, component video, S-video, composite video, HDTV
Connectors	BNC female (quantity varies with model)
Nominal level	1V p-p for Y of component video and S-video, and for composite video 0.7V p-p for RGB 0.3V p-p for R-Y and B-Y of component video, and for C of S-video

CONTINUED ON NEXT PAGE...

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Matrix 3200 & 6400 Series (continued)...

Minimum/maximum level(s)	Analog: 0.5V to 1.5V p-p with no offset
Impedance	75 ohms
Return loss	-30dB @ 5 MHz
External sync (genlock)	0.3V to 12V p-p, 75 ohms

VIDEO OUTPUT — WIDEBAND VIDEO BME

Number/signal type	Up to 32 or 64 (varies with configuration) RGBHV, RGBS, RGsB, RsGsBs, component video, S-video, composite video
Connectors	BNC female (quantity varies with configuration)
Nominal level	1V p-p for Y of component video and S-video, and for composite video 0.7V p-p for RGB 0.3V p-p for R-Y and B-Y of component video, and for C of S-video
Maximum level	2V p-p
Impedance	75 ohms
Return loss	-25dB to input section up to 50 MHz
DC offset	±10mV typical with input at 0 offset
Switching type	Triple-Action
Slew rate	>200V/ms

VIDEO OUTPUT — LOW RESOLUTION VIDEO BME

Number/signal type	Up to 32 or 64 (varies with configuration) RGsB, RsGsBs, component video, S-video, composite video, HDTV
Connectors	BNC female (quantity varies with configuration)
Nominal level	1V p-p for Y of component video and S-video, and for composite video 0.7V p-p for RGB 0.3V p-p for R-Y and B-Y of component video, and for C of S-video
Minimum/maximum levels	0.5V to 1.5V p-p
Impedance	75 ohms
Return loss	-40dB to input section at 3.58 MHz/4.43 MHz
DC offset	±10mV maximum with input at 0 offset
Switching type	Vertical interval
Slew rate	>200V/ms

SYNC — SYNC BME

Input and output types	Software configurable for RGBHV or RGBS
Sync connectors	Up to 64 or 32 BNC female (quantity varies with configuration)
Input level	0.5V to 5V p-p (4V p-p nominal)
Output level	5V p-p
Gain	AGC to TTL — 4.0V to 5.0V p-p
Input impedance	
Inputs 1 - 16	510 ohms or 75 ohms, switchable
Inputs 17 - 64	510 ohms
Output impedance	75 ohms
Horizontal frequency	15 kHz to 150 kHz
Vertical frequency	30 Hz to 150 Hz
Polarity	Positive or negative (follows input)

AUDIO — AUDIO BME

Routing	Up to 64 x 64 mono or stereo matrix (in increments of 8), balanced/unbalanced
Gain	Selectable per output...
Unbalanced output	0dB (as shipped), or -6dB (jumper-selectable)
Balanced output	+6dB (as shipped), or 0dB (jumper-selectable)
Frequency response	20 Hz to 20 kHz, ±0.05dB
THD + Noise	0.03% @ 20 Hz to 20 kHz, +15dBu input, +21dBu output nominal level
S/N	>85dB, balanced, at rated maximum output
Crosstalk	<-70dB @ 20 Hz to 20 kHz, fully loaded
Stereo channel separation	>70dB @ 20 Hz to 20 kHz
CMRR	>+75dB, 20 Hz to 20 kHz

AUDIO INPUT — AUDIO BME

Number/signal type	8 to 64 (in increments of 8) mono or stereo, balanced/unbalanced
Connectors	8 to 64 3.5 mm captive screw connector, 5 pole (stereo) or 3 pole (mono)
Impedance	>10 kohms unbalanced/balanced, DC coupled
Nominal level	-10dBV (316mV)
Maximum level	+21.5dBu, (balanced or unbalanced) at 1%THD+N
Input gain adjustment	-15dB to +9dB, adjustable per input via RS-232 control or front panel

AUDIO OUTPUT — AUDIO BME

Number/signal type	Up to 64 (in increments of 8) mono or stereo, balanced/unbalanced
Connectors	3.5 mm captive screw connectors, 5 pole (stereo) or 3 pole (mono) (quantity varies with configuration)
Impedance	50 ohms unbalanced, 100 ohms balanced
Gain error	±0.1dB channel to channel
Maximum level (Hi-Z)	>+26.0dBu, balanced at stated %THD+N
Maximum level (600 ohm)	>+24.0dBm, balanced at stated %THD+N

NOTE: *0dBu = 0.775 volts (RMS)*

CONTROL/REMOTE — SWITCHER

Serial control port	RS-232 or RS-422, 9-pin female D connector
System intercommunications	2 RJ-11 connectors
Remote keypad control	(2) 5 mm, 5-pole captive screw connectors
Program control	Extron's control program for Windows® Extron's Simple Instruction Set™ (SIS™)

GENERAL

Power*	100VAC to 240VAC, 50/60 Hz; internal, autoswitchable
Matrix 6400 wideband	110 watts at 115VAC, 60 Hz
Matrix 3200 wideband	50 watts at 115VAC, 60 Hz
Matrix 6400 video	90 watts at 115VAC, 60 Hz
Matrix 3200 video	40 watts at 115VAC, 60 Hz
Matrix 6400 sync	65 watts at 115VAC, 60 Hz
Matrix 3200 sync	35 watts at 115VAC, 60 Hz
Matrix 6400 audio	195 watts at 115VAC, 60 Hz
**A redundant power supply is available.*	
Rack mount	Yes
Enclosure type	Metal
5U dimensions	8.75" H x 17.0" W x 14.1" D (5U high, full rack width) 22.2 cm H x 43.2 cm W x 35.8 cm D (Depth excludes connectors. Width excludes rack ears.)
7U dimensions	12.25" H x 17.0" W x 14.1" D (7U high, full rack width) 31.1 cm H x 43.2 cm W x 35.8 cm D (Depth excludes connectors. Width excludes rack ears.)
Shipping/product weight, rack height	
Matrix 6400 wideband	42 lbs (19.1 kg)/29.1 lbs (13.2 kg), 7U
Matrix 3200 wideband	30 lbs (13.6 kg)/22.2 lbs (10.1 kg), 5U
Matrix 6400 video	33 lbs (15.0 kg)/25.3 lbs (11.5 kg), 5U
Matrix 3200 video	30 lbs (13.6 kg)/22.4 lbs (10.2 kg), 5U
Matrix 6400 sync	44 lbs (20.0 kg)/31.4 lbs (14.2 kg), 7U
Matrix 3200 sync	29 lbs (13.1 kg)/21.0 lbs (9.5 kg), 5U
Matrix 6400 audio	38 lbs (17.2 kg)/28.4 lbs (12.9 kg), 5U
DIM weight (all models)	44
Listings/Compliances	UL, CUL, CE, FCC Class A
Warranty	3 years parts and labor

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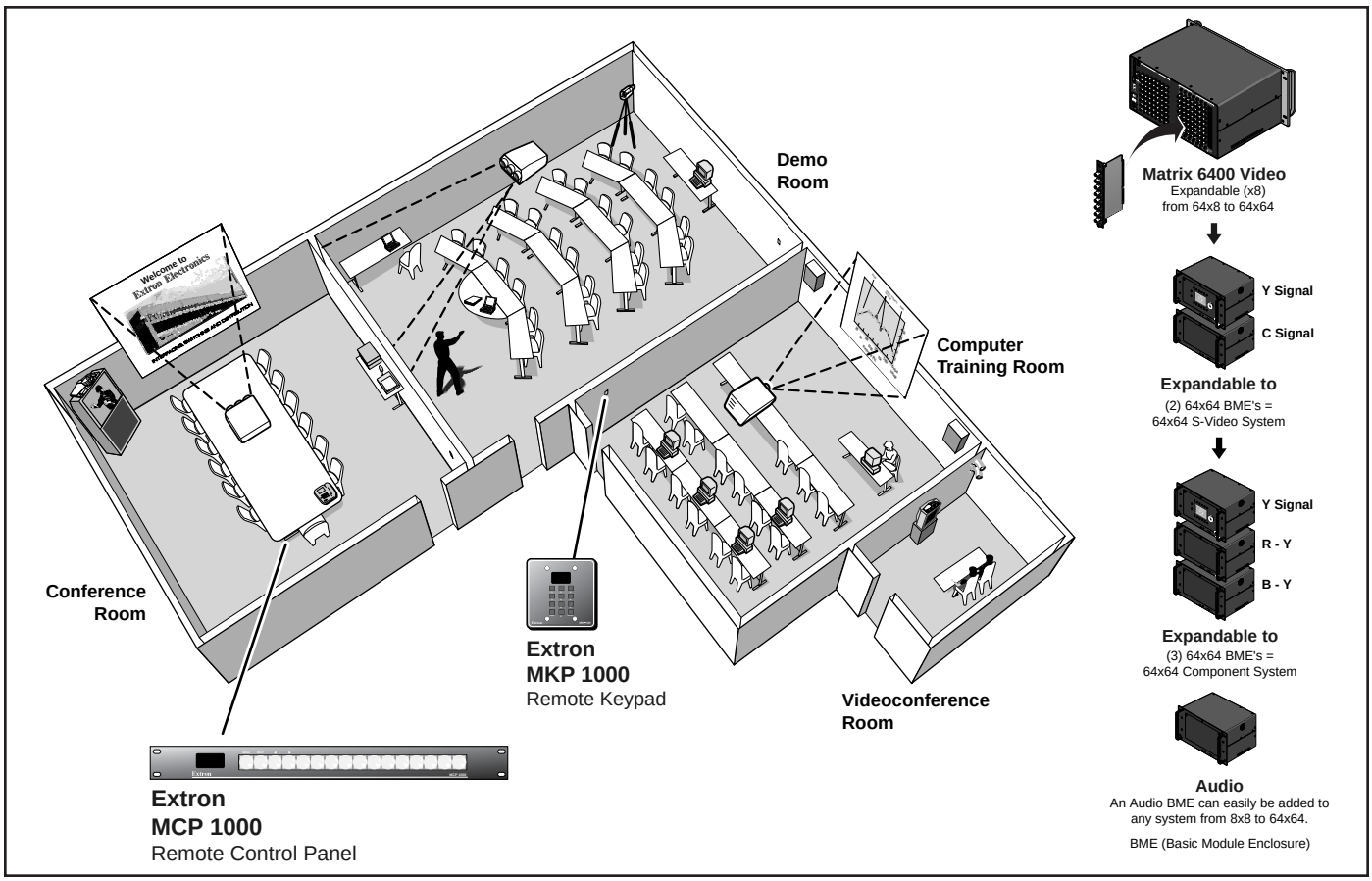
Matrix 3200 & 6400 Series (continued)...



MATRIX 3200 AND 6400 PART NUMBER SYSTEM EXPLANATION

Where "X" equals:
0 = Matrix 6400 Wideband
1 = Matrix 3200 Wideband
2 = Matrix 6400 Video
3 = Matrix 3200 Video
4 = Matrix 6400 Sync
5 = Matrix 3200 Sync
6 = Matrix 6400 Stereo Audio

60-25X-IOFR

Where "F" equals:
Front Panel Controller (FPC 1000)
0 = No
1 = Yes
*Note: FPC 1000 is not an option on sync BMEs.

Note:
Mono audio models will have part numbers beginning with 60-529-__ as opposed to 60-256-__ for stereo audio models.

Where "IO" equals:
Inputs/Outputs (Matrix size)
The I and the O are replaced by two characters that identify the exact size of the Matrix.
See table on page 208.

Where "R" equals:
Redundant Power Supply
0 = No
1 = Yes

An example of a typical Matrix 3200/6400 part number would be 60-250-HD11.
For this example: X = 0 – Matrix 6400 Wideband
IO = HD – 64 x 32, which was obtained from the Matrix 6400 Wideband part number table on page 208
F = 1 – Yes Front Panel Controller
R = 1 – Yes Redundant Power Supply

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Matrix 3200 & 6400 Series (continued)...

Matrix 3200 and 6400 Part Numbers

WIDEBAND BASIC MODULE ENCLOSURES

The Matrix 3200 and 6400 Wideband series offer 430 MHz (-3dB) bandwidth when fully loaded, assuring that the original signal integrity is maintained.

PHYSICAL OUTPUTS	MATRIX 3200 WIDEBAND (5U) PHYSICAL INPUTS		MATRIX 6400 WIDEBAND (7U) PHYSICAL INPUTS			
	16x	32x	16x	32x	48x	64x
8	60-251-AA	60-251-BA	60-250-AA	60-250-BA	60-250-CA	60-250-DA
16	60-251-AB	60-251-BB	60-250-AB	60-250-BB	60-250-CB	60-250-DB
24	60-251-BC	60-251-DC	60-250-BC	60-250-DC	60-250-FC	60-250-HC
32	60-251-BD	60-251-DD	60-250-BD	60-250-DD	60-250-FD	60-250-HD
40	- - -	- - -	60-250-CE	60-250-FE	60-250-IE	60-250-LE
48	- - -	- - -	60-250-CF	60-250-FF	60-250-IF	60-250-LF
56	- - -	- - -	60-250-DG	60-250-HG	60-250-LG	60-250-PG
64	- - -	- - -	60-250-DH	60-250-HH	60-250-LH	60-250-PH

NOTE: *NEED MORE THAN ONE ENCLOSURE FOR MULTIPLE VIDEO PLANES*

VIDEO BASIC MODULE ENCLOSURES

The Matrix 3200 and 6400 Video series offers 150 MHz (-3dB / >±0.5 dB) bandwidth for composite video, S-video, component video and HDTV applications. The units have video genlock capabilities which allow for vertical interval switching.

PHYSICAL OUTPUTS	MATRIX 3200 VIDEO (5U) PHYSICAL INPUTS	MATRIX 6400 VIDEO (5U) PHYSICAL INPUTS
	32x	64x
8	60-253-DA	60-252-HA
16	60-253-DB	60-252-HB
24	60-253-DC	60-252-HC
32	60-253-DD	60-252-HD
40	- - -	60-252-HE
48	- - -	60-252-HF
56	- - -	60-252-HG
64	- - -	60-252-HH

NOTE: *NEED MORE THAN ONE ENCLOSURE FOR MULTIPLE VIDEO PLANES*

SYNC BASIC MODULE ENCLOSURES

The Matrix 3200 and 6400 Sync switchers are capable of handling AGC to TTL level sync for H/V, separate H and V. They are non-configurable in 32x32 and 64x64 sizes.

PHYSICAL OUTPUTS	MATRIX 3200 SYNC (5U) PHYSICAL INPUTS	MATRIX 6400 SYNC (7U) PHYSICAL INPUTS
	32x	64x
32	60-255-DD	- - -
64	- - -	60-254-PH

NOTE: *NEED MORE THAN ONE ENCLOSURE FOR MULTIPLE SYNC PLANES*

AUDIO BASIC MODULE ENCLOSURES

The Matrix 6400 Audio switchers are fully configurable for 8x8 to 64x64 mono or stereo audio (balanced or unbalanced). These units allow adjustable audio gain/attenuation of audio from the front panel controls (FPC 1000) or RS-232/422.

PHYSICAL OUTPUTS	MATRIX 6400 STEREO AUDIO (5U) PHYSICAL INPUTS							
	8x	16x	24x	32x	40x	48x	56x	64x
8	60-256-AA	60-256-BA	60-256-CA	60-256-DA	60-256-EA	60-256-FA	60-256-GA	60-256-HA
16	60-256-AB	60-256-BB	60-256-CB	60-256-DB	60-256-EB	60-256-FB	60-256-GB	60-256-HB
24	60-256-AC	60-256-BC	60-256-CC	60-256-DC	60-256-EC	60-256-FC	60-256-GC	60-256-HC
32	60-256-AD	60-256-BD	60-256-CD	60-256-DD	60-256-ED	60-256-FD	60-256-GD	60-256-HD
40	60-256-AE	60-256-BE	60-256-CE	60-256-DE	60-256-EE	60-256-FE	60-256-GE	60-256-HE
48	60-256-AF	60-256-BF	60-256-CF	60-256-DF	60-256-EF	60-256-FF	60-256-GF	60-256-HF
56	60-256-AG	60-256-BG	60-256-CG	60-256-DG	60-256-EG	60-256-FG	60-256-GG	60-256-HG
64	60-256-AH	60-256-BH	60-256-CH	60-256-DH	60-256-EH	60-256-FH	60-256-GH	60-256-HH

NOTE: *FOR MONO AUDIO MODEL PART NUMBERS, REPLACE 60-256- IN ABOVE TABLE WITH 60-529- (I.E., 60-256-AA WOULD BECOME 60-529-AA FOR MONO AUDIO).*

MATRIX 3200/6400 ACCESSORIES & PART NUMBERS

FPC 1000 (7U ENCLOSURE)	60-276-01	6400 SERIES STEREO AUDIO 8 INPUT UPGRADE (1 CARD)	70-069-01
FPC 1000 (5U ENCLOSURE)	60-276-02	6400 SERIES STEREO AUDIO 8 OUTPUT UPGRADE (1 CARD)	70-070-01
MCP 1000M	60-298-01	6400 SERIES MONO AUDIO 8 INPUT UPGRADE (1 CARD)	70-232-01
MCP 1000S	60-298-02	6400 SERIES MONO AUDIO 8 OUTPUT UPGRADE (1 CARD)	70-233-01
MKP 1000 (GRAY)	60-239-01	7U ENCLOSURE POWER SUPPLY	70-083-01
MKP 1000 (BLACK)	60-239-02	5U ENCLOSURE POWER SUPPLY	70-083-02
MKP 1000 (WHITE)	60-239-03	AUDIO POWER SUPPLY	70-084-01
3200/6400 SERIES WIDEBAND INPUT UPGRADE (1 CARD)	70-066-01	MKP 1000 USER'S MANUAL	68-355-01
3200/6400 SERIES WIDEBAND INPUT UPGRADE (2 CARDS)	70-082-01	FPC 1000 USER'S MANUAL	68-355-02
3200/6400 SERIES WIDEBAND INPUT UPGRADE (4 CARDS)	70-081-01	MATRIX 6400 AUDIO USER'S MANUAL	68-355-03
3200/6400 SERIES WIDEBAND 8 OUTPUT UPGRADE (1 CARD)	70-067-01	MATRIX 6400/3200 VIDEO USER'S MANUAL	68-355-04
3200/6400 SERIES VIDEO 8 OUTPUT UPGRADE (1 CARD)	70-068-01	16" BNC EXTRACTION TOOL	100-096-01

NOTE: *UPGRADING OUTPUTS ON WIDEBAND BASIC MODULE ENCLOSURES MAY REQUIRE ADDITIONAL INPUT CARDS.*

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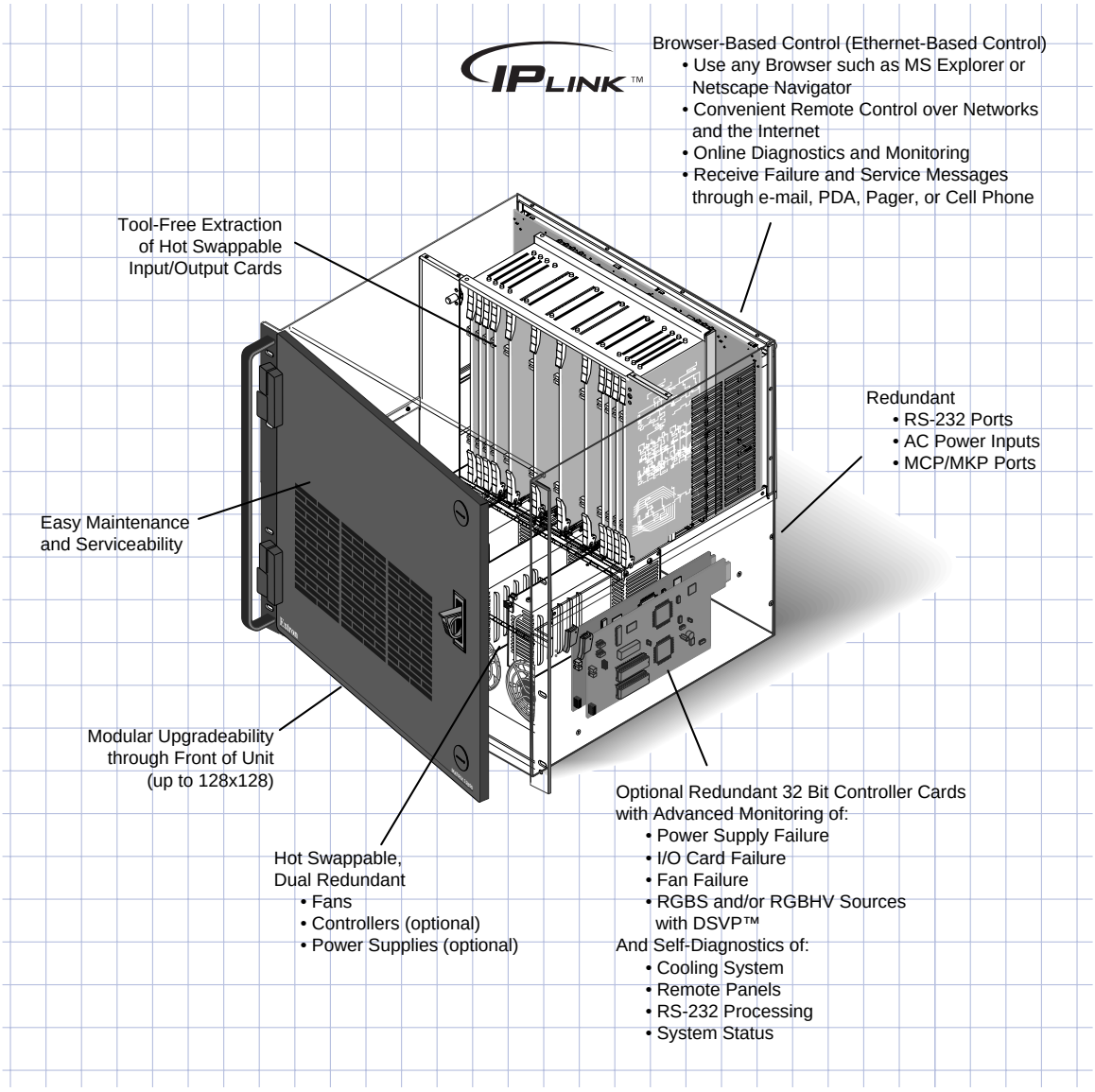
– Large Scale Modular RGB and Video Systems –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Hot Swappable, Dual Redundant
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Matrix 12800 Series

Fully Configurable Matrix Switchers with IP Link™

IP Link™ SIS™ Simple Instruction Set

Matrix 12800 Video

Matrix 12800 Wideband

Matrix 12800 Sync with DSVP

Matrix 12800 Mono and/or Stereo Audio

Producer Platinum Award Innovation in Technology 2008

DESCRIPTION

The Extron **Matrix 12800 Series** Matrix Switchers are the solution for very large-scale routing applications that require up to 128 inputs and 128 outputs. A matrix switcher is the most important asset in a centralized A/V switching environment. The cost-effective Matrix 12800 provides the performance, reliability, expandability, redundancy, and serviceability crucial to any mission-critical environment. With convenient control via the FPC 5000 front panel controller, MKP 1200 remote keypad, MCP 1000 Master Control Panel, or RS-232 and RS-422 control, the Matrix 12800 will fit within any system design. The Matrix 12800 wideband provides modular switching of RGBHV, RGBS, RsGsBs, RGsB, component video, S-video, composite video, and/or two channel stereo audio. With video bandwidth of 150 MHz or 375 MHz (-3dB) when fully loaded, the Matrix 12800 maintains the integrity of any routed signal.

The Matrix 12800 Series includes video, wideband, sync, and audio models. A minimum 32x16 configuration is provided for lowband, wideband, and sync frames, and a minimum 16x16 configuration is provided for audio. Each model includes the flexibility to upgrade to 128x128. Internal cards are hot swappable, so there is no need to power down the matrix switcher during field upgrades or expansion. A full complement of BNC connectors on the rear panel and modular internal card slots are ready to be filled as needed, ensuring that the Matrix 12800 switchers can grow to accommodate any system—even systems that are still expanding. From the start, Extron offers service and support for the planning, installation, maintenance, as well as expansion of any Matrix 12800 system.

SELF-MONITORING

The Matrix 12800 is an excellent choice for off-site or unmanned A/V systems, especially sensitive, 24 hours a day, 7 days a week environments. The self-monitoring features, redundant power, and cooling systems make the Matrix 12800 a uniquely reliable matrix switcher ideal for mission-critical applications, such as telco, government, or military installations. Advanced computer aided diagnostics provides 24-hour self-diagnostics of I/O boards, power supplies, controllers, cooling fans, and general functions of the switcher. Extron's exclusive Digital Sync validation Processing (DSVP™) verifies active sources by scanning all inputs for active sync signals. DSVP then transmits the horizontal and vertical scan rate information to the user via any type of control system using RS-232 and RS-422 commands. A user may monitor the status of the Matrix 12800's sources, functions, and internal components remotely using RS-232 and RS-422 IP Link™ Ethernet communications.

HOT SWAPPABLE AND REDUNDANT OPTIONS

For mission-critical applications, the Matrix 12800 offers the convenience of hot swappable I/O boards, power supplies, controllers, and cooling fans. Hot swappable components allow the user to replace any part at any time without having to power down the matrix. This is especially useful for crucial applications that require continuous operation of the Matrix 12800. The user may expand the switcher or swap out components without disrupting the switcher's functions.

The primary and backup power supplies handle both positive and negative DC voltages and are internally mounted within the switcher. The primary power supply system is configured to support automatic fail-over to a hot spare power supply. This means zero downtime for the system and no loss of functionality

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Matrix 12800 Series (continued)...

Easy maintenance and expandability

FPC 5000

should a power supply fail. This feature is necessary when power reliability is crucial. Both primary and redundant controllers monitor the matrix system. If the primary controller should fail, the redundant controller assumes management of the matrix system, providing added dependability. Also, installation and service are easy because there is no need for tools to remove each power supply and each is accessible through the front of the matrix switcher. Four cooling fans are provided for ventilation and heat management. Sensors notify the user of any failures—through visual cues, audio cues, or RS-232 and RS-422 communications. Fans and filters are easily accessible through the front panel for maintenance and replacement.

ROOMING PRESETS AND VIRTUALIZATION

Using a feature called "rooming," each Matrix 12800 can be programmed to assign multiple outputs to specific "rooms," allowing them to have their own grouped presets. Room presets offer unrivaled flexibility and convenience, particularly in systems that require switching between several locations. Once a room has been configured and stored, it is switched independently of other rooms so that signals sent to one room will never "walk" in on another room.

Rooming is made possible by user-defined virtual maps, which ascribe "locality" to the physical inputs and outputs of the Matrix 12800. Virtual mapping makes it possible to configure the switchers in unique ways, dictated by each virtual input/output (i.e., the assignment of each individual connector) and each group of connectors (called a *virtual plane*). Extron virtualization/control software makes these configurations possible. The software easily translates the appropriate virtual map into the switcher's memory with minimal effort on the part of the installer.

Matrix 12800 switchers offer global presets that can be set to define configurations of specific inputs to any specific combination of outputs or to all outputs. Rooming presets and global presets can be programmed and recalled (activated) at the front panel or by remote control.

These features are rounded out by advanced computer aided diagnostics, redundant power supplies, redundant cooling fans, DSVP, Triple-Action Switching™, and a rack-mountable enclosure. The convenient features and the hot swappable, modular design make the Matrix 12800 the best choice for very large-scale routing applications.

FPC 5000

The FPC 5000 Front Panel Controller is designed exclusively for the Extron Matrix 12800. It is an intuitive, 12.1 inch touch-screen, control interface for the Matrix 12800. The easy-to-use FPC 5000 can control, monitor, access, and manage all of the Matrix 12800 switcher set-up and control functions via an intuitive, menu-driven interface. Any user, regardless of their technical proficiency, can easily navigate through its simple and straightforward menus to change, monitor, or control the features of the Matrix 12800. With IP Link Ethernet capabilities, it can access the matrix from anywhere on a network, from multiple sites, as well as via the Internet. Housed within a 7U panel, the FPC 5000 can be installed in a rack, podium, or control console.

IP LINK™ ETHERNET CONTROL

The Matrix 12800 is equipped with Extron's IP Link™, an IP integration technology specifically engineered to meet the needs of professional A/V environments, from large universities and businesses to small home installations. IP Link provides these advantages:

- **Powerful scripting capability –** All IP Link products can run sophisticated user-programmable scripts. This feature enables automated functions to operate based on assignable criteria, such as turning connected equipment on or off at predetermined times and alerting individuals if a unit is disconnected from the network.
- **Global compatibility –** All IP Link products use industry standard Ethernet communication protocols, including ARP, DHCP, ICMP (ping), TCP/IP, Telnet, HTTP, and SMTP.
- **High performance architecture –** Web pages are served up to 50 times faster (6 Mbit/sec transfer rate) than many similar products.
- **Multi-user support –** 200 simultaneous connections enable each IP Link device to support many concurrent users and improve system throughput by sending information in parallel.
- **IP Link Global Viewer –** The included management application software allows the user to control, monitor, and schedule various functions of serially-controlled products connected to IP Link products.

SIS™ CONTROL

SIS simplifies RS-232 by utilizing a limited set of commands that are easy to remember and use. Three factors that make SIS superior for RS-232 remote control are that characters can be generated directly from the keyboard, the same instruction works with many Extron products, and it provides informative responses to each command sent.

CONTINUED ON NEXT PAGE...

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Matrix 12800 Series (continued)...

FEATURES

- **375 MHz (-3dB) RGB video bandwidth, fully loaded–** Ensures switching and distribution of signals without signal degradation. The 375 MHz (-3dB) rating is a worst case specification, i.e., the Matrix 12800 provides 375 MHz (-3dB) at full performance capacity—when one input signal drives all outputs.
- **150 MHz (-3dB) Low resolution video bandwidth, fully loaded–** For lower resolution video signals where high bandwidth is not required, such as composite video, S-video, and component video systems.
- **Field-upgradeable and hot swappable, modular design–** The Matrix 12800 provides the highest level of flexibility, expandability, and affordability by allowing users to purchase only the modules required for their systems. Additional input and output cards may be added at any time through the front panel for easy and quick upgradeability or expansion. Hot swappable components allow the user to replace any part at any time—no need to power down the switcher. This is especially useful for crucial applications that require continuous operation of the Matrix 12800.
- **Advanced computer aided diagnostics–** Provides 24-hour self-diagnostics of input/output boards, primary and redundant power supply voltages, controllers, cooling status, and overall functional status of the matrix. Using a RS-232 and RS-422 communications port, status monitoring is possible for off-site or unmanned locations, such as telco, government, military, or any other sensitive, 24 hours a day, 7 days a week environments.
- **Triple-Action Switching–** The Matrix 12800 is capable of programmable RGB delay on every output. RGB delay blanks the screen when the matrix switcher switches to a new source. The new sync signals precede the RGB signals, so there is no glitch shown during the transition. The time delay between the RGB and sync signals is user adjustable up to five seconds.
- **Easy maintenance and serviceability for low mean-time to repair–** With the front panel allowing full accessibility to the internal workings and modular assemblies, the basic architecture of the matrix allows for easy maintenance and serviceability, as well as low mean-time to repair.
- **Dual, fully redundant, and hot swappable components–** Primary and back-up controllers, power supplies, and cooling fans provide added reliability for critical applications. The optional redundant controller provides mirrored memory, CPU and auto-failover capabilities, and a secondary RS-232 port, enabling a redundant third party control system to communicate with the matrix system. It also provides an increased level of reliability by adding an additional controller that assumes management of the matrix system if a primary controller failure should occur. Primary and back-up power supplies for both positive and negative DC voltages are internally mounted. The primary power supply system is configured to support automatic fail-over to a hot spare power supply. This means zero downtime for the system and no loss of functionality should the primary power supply fail. Cooling fans are provided for ventilation and heat management. Sensors communicate failure notification visually, audibly, and via RS-232 and RS-422. power supplies, fans, and filters are easily accessible through the front panel for maintenance and replacement.
- **Digital Sync Validation Processing (DSVP™)–** Extron's exclusive DSVP verifies active sources by scanning all inputs for active sync signals. DSVP then transmits the horizontal and vertical scan rate information to the user via any type of control system using RS-232 and RS-422 commands.
- **Channel-to-channel isolation–** The Matrix 12800 Series provides excellent isolation between channels and extremely low electromagnetic emissions—perfect for minimizing signal leakage in high security or government environments.
- **Presets–** The Matrix 12800 can be configured for several different applications without the need to change the settings each time the application changes.
- **Video genlock–** The Matrix 12800 includes broadcast quality NTSC, PAL, and SECAM video genlock capabilities, which enable vertical interval switching. This results in smooth, seamless transitions when switching between inputs.
- **Two AC power inputs–** For added power reliability, some 24-hour environments offer two separate AC power sources, one as the primary source and the second as a redundant one. The Matrix 12800 offers two AC power inputs for continuous connection to both power sources.
- **RS-232 and RS-422 control–** The Matrix 12800 offers RS-232 and RS-422 control, which allows the switcher to be controlled via a third party control system.
- **Simple Instruction Set (SIS™)–** Extron SIS is a set of basic ASCII code commands that provide simple control through a third party control system. Instead of programming in long, obscure strings of code, SIS makes it easy to operate an Extron product using RS-232 and RS-422 control.
- **Extron virtualization/control software–** For RS-232 and RS-422 remote control from a PC, Extron ships our Windows®-based control software with every matrix switcher. This icon-driven software uses a graphical, drag-and-drop interface to make I/O configuration and other customization functions simple and convenient. This software also offers an emulation mode for configuration of an offsite matrix switcher; the I/O configuration may then be saved for future downloading to the matrix switcher.
- **MCP 1000 and MKP 1000 control–** Utilizing the MCP 1000 Master Control Panel and any combination of MCP 1000 slave control panels or MKP 1000 control keypads offers the flexibility to control the Matrix 12800 from a remote location. Both remote control options are easy to use and provide tactile buttons for quick selection. Each MCP 1000 panel may be used for one-button switching for a particular output and selecting global presets. Each MKP 1000 keypad may be used to select a different input or select a preset.
- **Balanced or unbalanced audio–** The Matrix 12800 switches both balanced or unbalanced mono or stereo audio signals. Depending on the application and cable distance requirements, some systems will require balanced audio.
- **Adjustable input audio gain and attenuation–** The Matrix 12800 allows users to set the gain/attenuation level (-24dB to +9dB) from the front panel or RS-232 and RS-422. Individual input audio levels may be adjusted so there are no noticeable volume differences between sources.
- **Audio breakaway–** With breakaway switching, Matrix 12800 switchers can separate the audio signal from the video signal to switch either video only or audio only. The breakaway feature allows audio follow on any one or all channels, or the audio inputs and outputs can be operated as a separate audio matrix.
- **Trouble status indication (SmartControl)–** The SmartControl microprocessor within the CPU of the Matrix 12800 acts as a status indicator at all times.
- **Security lockout–** If a Matrix 12800 is installed in an unsecured environment, an optional password feature can be implemented. When this feature is in use, a password is required to operate the front panel controller.
- **IP Link™ (Ethernet) –** An exclusive technology developed by Extron specifically engineered to meet the needs of professional A/V environments, which enables the Matrix 12800 to be controlled and proactively monitored over a LAN, WAN, or the Internet. An intuitive Web interface is also included for such common functions as I/O switching, system control, and online diagnostics and monitoring.
- **Web page serving capabilities –** Extron IP Link control provides web hosting with online pages for full functionality and monitoring of the product via any web browser. In addition, custom web pages can be produced with any off-the-shelf web page development software program, such as Macromedia® Dreamweaver® or Microsoft® FrontPage®, to create your own HTML pages or java applets.

CALL EXTRON FOR PART NUMBERS AND PRICES

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Matrix 12800 Series (continued)...

SPECIFICATIONS

VIDEO —WIDEBAND/VIDEO BMEs

Routing	32 x 16 or larger matrix up to 128 x 128, depending on the configuration
Gain	Unity
Bandwidth	
Wideband models	375 MHz (-3dB), fully loaded 0 MHz to 10 MHz — no more than +0.1dB to -0.1dB 0 MHz to 130 MHz — no more than +4dB to -0.25dB
Video models	150 MHz (-3dB), fully loaded 0 MHz to 10 MHz — no more than +0.1dB to -0.1dB 0 MHz to 30 MHz — no more than +0.5dB to -0.5dB
Phase between I/Os	<1.28° at 3.58 MHz
Differential phase error	0.1%, 3.58 to 4.43 MHz
Differential gain error	0.1°, 3.58 to 4.43 MHz
Max. propagation of delay	5 ns typical (±1 ns)
Crosstalk	-80dB @ 1 MHz, -62dB @ 10 MHz, -52dB @ 30 MHz
Switching speed	200 ns (max.)

VIDEO INPUT — WIDEBAND/VIDEO BMES

Number/signal type	
Wideband models	Up to 128 (varies with configuration) RGBHV, RGBS, RGsB, RsGsBs, component video, S-video, composite video
Video models	Up to 128 (usable quantity varies with configuration) component video, S-video, composite video
Connectors	128 BNC female (usable quantity varies with model)
Nominal levels	1V p-p for Y of component video and S-video, and for composite video 0.7V p-p for RGB 0.3V p-p for R-Y and B-Y of component video, and for C of S-video
Minimum/maximum levels	Analog: 0.5V to 1.5V p-p with no offset
Impedance	75 ohms
Return loss	<-30dB @ 5 MHz

VIDEO OUTPUT — WIDEBAND/VIDEO BMES

Number/signal type	Up to 128 (varies with configuration) RGBHV, RGBS, RGsB, RsGsBs, component video, S-video, composite video
Connectors	128 BNC female (usable quantity varies with model)
Nominal levels	1V p-p for Y of component video and S-video, and for composite video 0.7V p-p for RGB 0.3V p-p for R-Y and B-Y of component video, and for C of S-video
Maximum level	2V p-p
Impedance	75 ohms
Return loss	-25dB to input section @ up to 50 MHz
DC offset	±10mV typical with input at 0 offset
Switching type	Triple-Action
Slew rate	>200V/ms

SYNC — SYNC BME

Input and output types	Software configurable for RGBHV or RGBS
Sync connectors	Up to 128 BNC female (usable quantity varies with configuration)
Input level	0.5V to 5V p-p (4V p-p nominal)
Output level	5V p-p
Gain	AGC to TTL — 4.0V to 5.0V p-p
Input impedance	
Inputs 1 - 32	510 ohms or 75 ohms, switchable
Inputs 33 - 128	510 ohms
Output impedance	75 ohms
Horizontal frequency	15 kHz to 150 kHz
Vertical frequency	30 Hz to 150 Hz
Polarity	Positive or negative (follows input)

AUDIO — AUDIO BME

Routing	16 x 16 up to 128 x 128 mono or stereo matrix (in increments of 16), balanced/unbalanced
Gain	Selectable per output...
Unbalanced output	0dB (as shipped), or -6dB (jumper-selectable)
Balanced output	+6dB (as shipped), or 0dB (jumper-selectable)
Frequency response	20 Hz to 20 kHz, ±0.05dB
THD + Noise	0.03% @ 20 Hz to 20 kHz, +15dBu input, +21dBu output
S/N	>85dB, balanced, at rated maximum output
Crosstalk	<-70dB @ 20 Hz to 20 kHz fully loaded
Stereo channel separation	>70dB @ 20 Hz to 20 kHz
CMRR	>+75dB, 20 Hz to 20 kHz

AUDIO INPUT — AUDIO BME

Number/signal type	16 to 128 (in increments of 16) mono or stereo, balanced/unbalanced
Connectors	(16 to 128) 3.5 mm captive screw connectors, 5 pole
Impedance	>10 kohms unbalanced/balanced, DC coupled
Nominal level	+4dBu (1.23V), 0dBu (0.775V), -10dBV (316mV), -20dBV (100mV)
Maximum level	+21.5dBu, (balanced or unbalanced) at 1%THD+N
Input gain adjustment	-24dB to +9dB, adjustable per input via RS-232 control or front panel

AUDIO OUTPUT — AUDIO BME

Number/signal type	16 up to 128 (in increments of 16) mono or stereo, balanced/unbalanced
Connectors	(16 to 128) 3.5 mm captive screw connectors, 5 pole (quantity varies with configuration)
Impedance	50 ohms unbalanced, 100 ohms balanced
Gain error	±0.1dB channel to channel
Maximum level (Hi-Z)	>+26.0dBu, balanced at 1%THD+N
Maximum level (600 ohm)	>+24.0dBm, balanced at 1%THD+N

NOTE: *0dBu = 0.775 volts (RMS)*

CONTROL/REMOTE — SWITCHER

Serial control port	RS-232 or RS-422, 9-pin female D connector
Ethernet control port	1 RJ-45 female connector
Ethernet data rate	10/100Base-T, half/full duplex with autodetect
Ethernet protocol	ARP, ICMP (ping), TCP/IP, Telnet, HTTP, SMTP
System intercommunications	2 RJ-45 connectors
Remote keypad control	(2) 5 mm, 5-pole captive screw connectors
Program control	Extron's control program for Windows® Extron's Simple Instruction Set™ (SIS™) Microsoft Explorer, Netscape Navigator, Telnet

GENERAL

Power*	2 (positive-negative), 100VAC to 240VAC, 50/60 Hz; internal, autoswitchable
Matrix 12000 wideband	150 watts at 115VAC, 60 Hz
Matrix 12800 sync	100 watts at 115VAC, 60 Hz
Matrix 12800 audio	300 watts at 115VAC, 60 Hz
** A redundant power supply is available.*	
Rack mount	Yes
Enclosure type	Metal
Enclosure dimensions	17.5" H x 17.0" W x 16.0" D (10U high, full rack width) 44.4 cm H x 43.2 cm W x 40.6 cm D (Depth excludes connectors. Width excludes rack ears.)
Product weight	
Matrix 12800 wideband	57.4 lbs (26.0 kg)
Matrix 12800 sync	54.0 lbs (24.5 kg)
Matrix 12800 audio	43.9 lbs (19.9 kg)
Shipping weight	
Matrix 12800 wideband	76.7 lbs (34.8 kg)
Matrix 12800 sync	73.3 lbs (33.2 kg)
Matrix 12800 audio	66 lbs (29.9 kg)
DIM weight	77
Listings/Compliances	UL, CUL, CE, FCC Class A, VCCI, AS/NZS, ICES
Warranty	3 years parts and labor

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ISM 182 & ISM 482

Integration Scaling Matrix Switchers with Audio

IP LINK™ HDTV READY! SIS™ Simple Instruction Set

ISM 482

DESCRIPTION

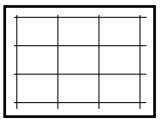
The Extron **ISM Series** Integration Scaling Matrix switchers with eight configurable inputs and two audio/video outputs feature two built-in, high performance video scalers. The ISM Series features proprietary Extron technologies for superior scaling, such as 3:2 and 2:2 pulldown, Dynamic Motion Interpolation (DMI™), and patented Accu-RATE Frame Lock (AFL™). This series is designed for installation applications that require matrix switching and two individually scaled outputs. The ISM Series provides flexibility in selecting output resolution to two different displays. These matrix switchers are ideal solutions for use in dual-display videoconferencing and presentation environments such as boardrooms, conference rooms, classrooms, courtrooms, churches, and auditoriums.

There are two matrix switchers/scalers in this series: the **ISM 182** and the **ISM 482**. Both offer comparable features: eight video inputs configurable for RGBHV, RGBS, RGsB, component video, S-video, or composite video on female BNCs and two high resolution RGB outputs on female BNCs and/or female 15-pin HD connectors. Stereo audio (balanced/unbalanced) is accepted on eight, 3.5 mm captive screw connectors and is output (balanced/unbalanced) on two, 3.5 mm captive screw connectors. In addition to the listed video formats, the ISM 482 also accepts HDTV. The ISM 182 can output 17 different rates up to 1024 x 768. The ISM 482 supports 32 different output rates, up to 1365 x 1024 and including 720p, 1080p, and 1080i.

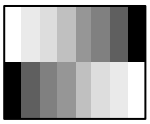
The ISM Series matrix switchers can be controlled through the RS-232 serial port or the IP Link port. IP Link is an exclusive technology developed by Extron specifically engineered to meet the needs of professional A/V environments. IP Link provides the ISS Series with Ethernet capabilities, enabling proactive management and troubleshooting over high-speed LANs, WANs, or even the Internet. An intuitive Web interface is also included for such common functions as I/O switching, system control, and online diagnostics and proactive monitoring.

FEATURES

- **Eight configurable inputs–** The ISM Series features eight, fully configurable inputs on female BNCs. The ISM 182 accepts RGBHV, RGBS, RGsB, component, S-video, and/or composite video. The ISM 482 accepts those same formats, plus HDTV.
- **Outputs–** Two individually scaled signal outputs are available on BNCs and 15-pin HD connectors. A black screen is also available for output.
- **Scaled output resolutions–** The ISM 182 offers 17 user-selectable computer-video output rates up to 1024 x 768. The ISM 482 provides 32, user-selectable computer-video output rates, up to 1365 x 1024 and including 720p, 1080p, and 1080i.
- **3:2 (NTSC) and 2:2 (PAL) pulldown detection–** Advanced film mode processing techniques help maximize image detail and sharpness for NTSC or PAL sources that originated from film (patent pending).
- **Dynamic Motion Interpolation (DMI)–** DMI technology is an advanced motion detection and compensation method used to deliver the best aspects of still and motion algorithms. This process results in a superior level of image enhancement capability with no loss of image fidelity.
- **Accu-RATE Frame Lock (AFL)–** A patented technology exclusive to Extron that solves frame rate conversion issues experienced by video scalers. When video input and output refresh rates differ, there are certain points in time when the two rates cross over each other. The result is a glitch or image freeze on the display. AFL solves this problem by locking the output frame rate to the input frame rate.
- **Triple-Action Switching™ (RGB delay)–** RGB delay blanks the screen when the matrix switcher switches to a new source. The new sync signals precede the RGB signals, so there is no glitch shown during the transition. Time delay between RGB and sync signals is adjustable up to five seconds.
- **Test patterns–** Ten test patterns are available, including a crop pattern, cross hatch, 16 bar gray scale, color bars, alternating pixels, ramp, 4 x 4 cross hatch for use with video walls, and three film aspect ratio patterns (1.78, 1.85, and 2.35) for setting up letterbox DVDs. It also features a blue-only mode for proper setup of the video scaler.



4x4 Crosshatch



Gray Scale

- **QuickSwitch Front Panel Controller (QS-FPC)–** The QuickSwitch FPC allows for touch-of-a-button input and output selection. Extron QuickSwitch technology eliminates the learning curve usually associated with switching the inputs and outputs of a matrix switcher by using a tactile front panel button for every input and output.
- **Picture controls–** Brightness, contrast, color, tint, horizontal and vertical sizing, horizontal and vertical centering, four user-selectable levels of horizontal detail, and eight user-selectable levels of vertical detail provided.
- **16 auto-memories per input–** Each input supports 16 auto recall memories, based on the incoming horizontal and vertical frequencies. These memories recall sizing, centering, detail, contrast, and brightness information for each source, saving time and effort in fine-tuning displayed images.
- **Front panel input label windows–** Input buttons may easily be labeled by any Brother P-Touch™ labeler or by Extron label software, which ships with every Extron matrix switcher. Each input can be labeled with names, alphanumeric characters, or color bitmaps for easy input/output selection.
- **RS-232 control–** A rear panel, RS-232 control port provides connection of the ISM Series to a third party control system.
- **Simple Instruction Set™ (SIS™)–** Extron SIS is a set of basic ASCII code commands that provides simple control through a third-party control system. Instead of programming in long, obscure strings of code, SIS makes it easy to operate an Extron product using RS-232 control.

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ISM 182 & ISM 482 (continued)...

- **IP Link™ Control–** An exclusive technology developed by Extron specifically engineered to meet the needs of professional A/V environments that enables the ISS Series to be controlled and proactively monitored over a LAN, WAN, or the Internet. An intuitive Web interface is also included for such common functions as I/O switching, system control, and online diagnostics and monitoring.
- **Control software–** For RS-232 remote control from a PC, Extron ships Windows®-based control software with every matrix switcher. This icon-driven software uses a graphical drag-and-drop interface to make I/O configuration and other customization functions simple and convenient.
- **Balanced & unbalanced audio–** Accepts both balanced and unbalanced audio signals. Gain and attenuation adjustments can be made directly from the front panel, input by input.
- **Audio breakaway–**Provides the capability to break away an audio signal from its corresponding video signal. Audio breakaway switching can be accomplished via front panel control or RS-232 remote.
- **Executive mode–**Locks out all front panel functions except basic switching and control commands; all other functions, however, remain active through RS-232 control.
- **Rack-mountable–** The ISM 182 and ISM 482 are both housed in 3U, full rack width metal enclosures.
- **Internal international power supply–**The 100-240VAC, 50/60 Hz, autoswitchable internal power supply of the ISM Series provides worldwide power compatibility.

MODEL	PART #
ISM 182	60-424-01
ISM 482	60-425-01

OPTIONAL ACCESSORIES

SVHSF-BNCM 6' (1.83 m) .....26-541-04 (page 418)
SY 15 HDM-RGBHVF 6" (0.15 m) .....26-531-01 (page 408)

SPECIFICATIONS

VIDEO

Routing ..... 8 x 2 matrix

VIDEO INPUT

Number/signal type ..... 8 RGBHV, RGBS, RGsB, RGBcvS, component video, S-video, composite video
Connectors ..... 8 x 5 female BNC
Nominal level..... 1V p-p for Y of component video and S-video, and for composite video
0.7V p-p for RGB
0.3V p-p for R-Y and B-Y of component video, and for C of S-video
Minimum/maximum levels ..... Analog: 0V to 1.0V p-p with no offset
Impedance ..... 75 ohms
Horizontal frequency ..... Autoscan 15 kHz to 100 kHz
Vertical frequency ..... Autoscan 50 Hz to 100 Hz
Resolution range ..... Autoscan 720 x 525 to 1600 x 1200

VIDEO PROCESSING

Decoder..... 9 bit digital
Digital sampling..... 24 bit, 8 bits per color; 13.5 MHz standard (video), 140 MHz standard (RGB)
Colors ..... 16.78 million
Horizontal filtering..... 4 levels
Vertical filtering ..... 8 levels

VIDEO OUTPUT

Number/signal type ..... 2 RGBHV, RGBS
Connectors ..... 2 x 5 BNC female, (2) 15-pin HD female
Nominal level..... 0.7V p-p for RGB
Minimum/maximum levels ..... 0V to 0.7V p-p
Impedance ..... 75 ohms
Scaled resolutions
ISM 182 ..... 640x480[1,3,4,5], 800x600[1,3,4,5], 832x624[3,4,5], 848x480[3], 852x480[3], 1024x768[1,3,4,5]
ISM 482 ..... 640x480[1,3,4,5], 800x600[1,3,4,5], 832x624[3,4,5], 848x480[3], 852x480[3], 1024x768[1,3,4,5], 1280x768[2], 1280x1024[1,3,5], 1360x765[3], 1365x1024[3,5], 480p[3,5], 720p[3,5], 1080p[3,5], 1080i[2,5]
[1] = at 50 Hz, [2] = at 56 Hz, [3] = at 60 Hz, [4] = at 75 Hz
[5] = locked to the current input's vertical refresh rate
Return loss ..... -30dB @ 5 MHz
DC offset ..... ±5mV maximum with input at 0 offset

SYNC

Input type ..... Autodetect RGBHV, RGBS, RGsB
Output type..... RGBHV, RGBS
Standards ..... NTSC 3.58, NTSC 4.43, PAL, SECAM
Input level ..... 0V to 5.0V p-p
Output level ..... 0V to 5.0V p-p, unterminated
Input impedance ..... 510 ohms
Output impedance ..... 75 ohms
Max. input voltage ..... 5.0V p-p
Max. propagation delay..... 20 ns
Polarity ..... Positive or negative (selectable)

AUDIO

Routing ..... 8 x 2 stereo matrix
Gain ..... Unbalanced output: 0dB; balanced output: +6dB
Frequency response ..... 20 Hz to 20 kHz, ±0.05dB
THD + Noise ..... 0.03% @ 1 kHz at nominal level
S/N ..... >90dB at rated maximum output
Crosstalk ..... <-80dB @ 1 kHz,fully loaded
Stereo channel separation ..... >90dB @ 1 kHz
CMRR ..... >75dB @ 20 Hz to 20 kHz

AUDIO INPUT

Number/signal type ..... 8 stereo, balanced/unbalanced
Connectors ..... (8) 3.5 mm captive screw connectors, 5 pole
Impedance ..... >10 kohms unbalanced/balanced, DC coupled
Nominal level..... Configurable: -60dBV (1mV), +4dBu (1.23V), 0dBu (0.775V), -10dBV (316mV), -20dBV (100mV)
Maximum level ..... +19.5dBu, (balanced or unbalanced) at 1%THD+N
Input gain adjustment ..... –15dB to +9dB, adjustable per input

AUDIO OUTPUT

Number/signal type ..... 2 stereo, balanced/unbalanced
Connectors ..... (2) 3.5 mm captive screw connectors, 5 pole
Impedance ..... 50 ohms unbalanced, 100 ohms balanced
Gain error ..... ±0.1dB channel to channel
Maximum level (Hi-Z) ..... >+21dBu, balanced or unbalanced at stated %THD+N
Maximum level (600 ohm) ..... >+15dBm, balanced or unbalanced at stated %THD+N
NOTE: *0dBu = 0.775 volts (RMS).*

CONTROL/REMOTE

Serial control port ..... RS-232, 9-pin female D connector
Ethernet control port ..... 1 RJ-45 female connector
Ethernet data rate ..... 10/100Base-T, half/full duplex with autodetect
Ethernet protocol..... ARP, ICMP (ping), TCP/IP, Telnet
Program control..... Extron's control program for Windows®
Extron's Simple Instruction Set™ – SIS™
Microsoft Internet Explorer, Netscape Navigator, Telnet

GENERAL

Power ..... 100VAC to 240VAC, 50/60 Hz, 60 watts, internal, autoswitchable
Rack mount..... Yes
Enclosure type ..... Metal
Enclosure dimensions ..... 5.25" H x 17.5" W x 11.2" D (3U high, full rack width)
13.3 cm H x 48.3 cm W x 28.4 cm D
(Depth excludes connectors and knobs. Width excludes rack ears.)
Product weight ..... 11.2 lbs (5.1 kg)
Shipping weight ..... 17 lbs (7.7 kg)
DIM weight
USA/Canada..... 18 lbs (8.2 kg)
International..... 21 lbs (9.5 kg)
Listings/Compliances ..... UL, CUL, CE, FCC Class B
Warranty ..... 3 years parts and labor

CONTINUED ON NEXT PAGE...

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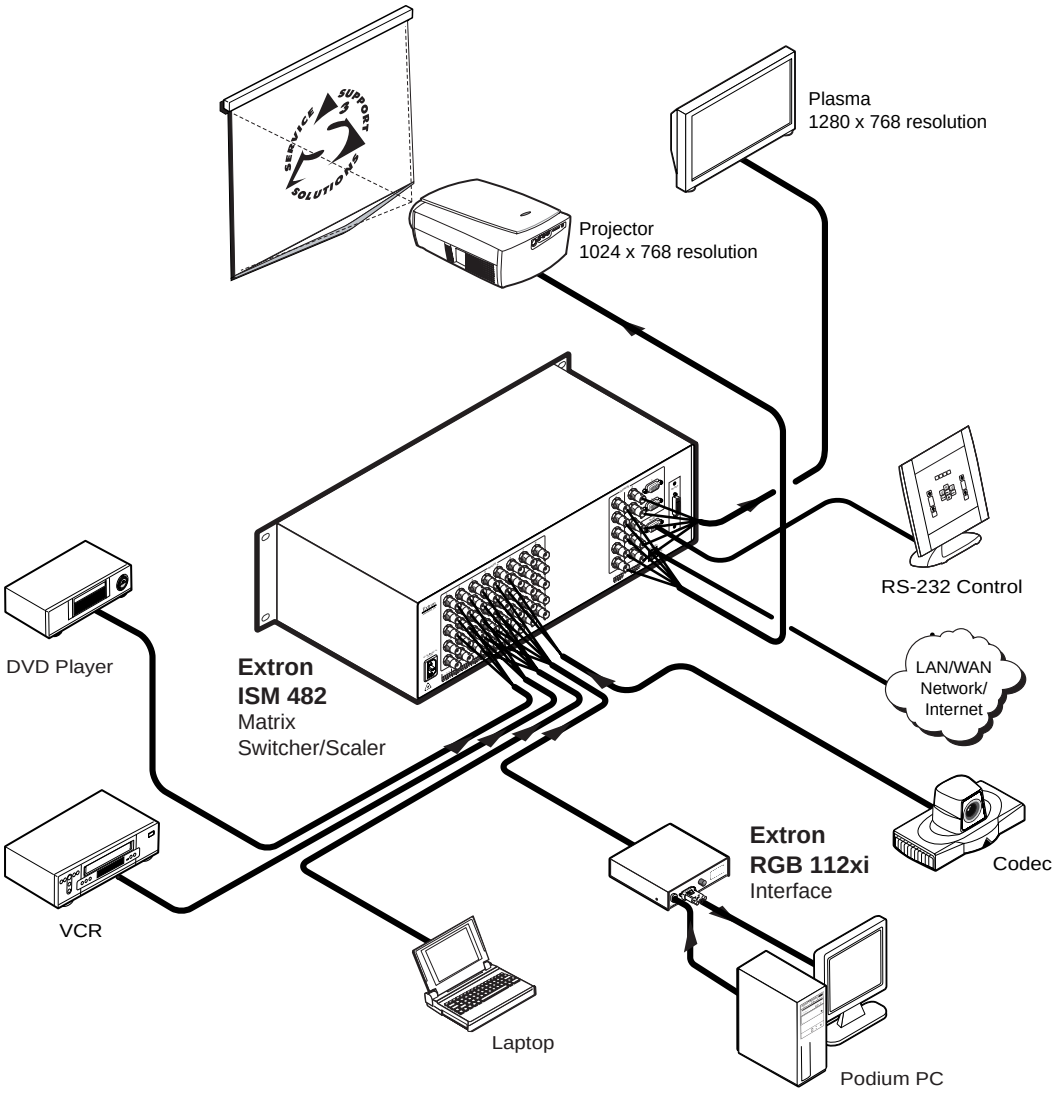
ISM 182 & ISM 482 (continued)...

APPLICATION



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